

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE

CMC MATERIALS, INC.,	)	
	)	<b>Redacted - Public Version</b>
Plaintiff,	)	
	)	C.A. No. 20-738-JLH
v.	)	
	)	
DUPONT DE NEMOURS, INC., et al.,	)	
	)	
Defendants.	)	

**JOINT CLAIM CONSTRUCTION BRIEF**

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**TABLE OF ABBREVIATIONS**

The following identified abbreviations are used throughout this brief:

<b>Word or Phrase</b>	<b>Abbreviation</b>
Plaintiff CMC Materials, Inc.	CMC or Plaintiff
Defendants DuPont de Nemours, Inc., Rohm and Haas Electronic Materials CMP LLC (formerly known as Rohm and Haas Electronic Materials CMP Inc.), Rohm and Haas Electronic Materials CMP Asia Inc. (d/b/a Rohm and Haas Electronic Materials CMP Asia Inc., Taiwan Branch (U.S.A.)), Rohm and Haas Electronic Materials Asia-Pacific Co., Ltd., Rohm and Haas Electronic Materials K.K., and Rohm and Haas Electronic Materials LLC	DuPont or Defendants
D.I. 207 (Joint Claim Construction Chart)	JCCC
U.S. Patent No. 9,499,721	'721 Patent, the Asserted Patent or the Patent
Claims 1, 14, 17, 20, 26, 27, 31, 36, 37, and 42 of the '721 Patent	Asserted Claims
Defendants' Optiplane 2300 family which includes at least Optiplane 2300 (original), Optiplane 2300A (a.k.a., OP2300 CIP1) and components thereof, and DuPont's Optiplane 2600 family which includes at least Optiplane 2600, Optiplane 2601, Optiplane 2602, Optiplane 2300 (current), as well as products with identifiers T-D2200 and T-D206 and components thereof	Accused Products
Chemical mechanical planarization (also referred to as chemical mechanical polishing)	CMP



Word or Phrase	Abbreviation
Person of Ordinary Skill in the Art	POSA
International Trade Commission	ITC
Administrative Law Judge	ALJ
<i>Certain Chemical Mechanical Planarization Slurries and Components Thereof</i> , Inv. No. 337-TA-1204	1204 Investigation
Initial Determination by the ALJ, adopted as the Final Determination by the ITC for the 1204 Investigation	ID
Permanent positive charge	PPC
Exhibit Number and page range in Joint Appendix	Ex._JA
United States Patent and Trademark Office	USPTO
Zeta potential	ZP
Added emphasis, unless otherwise indicated	<b><i>Bold italic</i></b>

## I. INTRODUCTION

### A. Defendants' Answering Introduction

#### 1. DuPont's proposed constructions are true to the intrinsic evidence and supported by the extrinsic evidence.

The '721 patent contains two independent claims. The first, claim 1, read in light of the specification and as distinguished during prosecution, recites a composition containing water at an acidic pH and "colloidal silica" particles that have inside them nitrogen- or phosphorous-containing chemical compounds ("chemical species") *without any* "aminosilanes" or "phosphonium silanes" compounds such that the particles have a "permanent positive charge" ("PPC") of at least 15 mV." Since the claim provides no other possible source for the PPC, the only reasonable reading (endorsed by the specification) is that the PPC *results from* the internally incorporated "chemical species." This is reflected in DuPont's Term 3 construction.

Inconsistent with the specification and prosecution history and contrary to the named inventor's so-called "aha" moment, Plaintiff's Term 3 construction would allow the PPC to result entirely from unrecited, external sources, relegating the internal chemical species to trace amount. This would also read directly on prior art particles that had been [REDACTED] [REDACTED] but not disclosed during prosecution. Similarly inconsistent with the specification and prosecution history, Plaintiff's construction of Term 2 places "no restrictions on other chemical species" that could be incorporated within the particles. Plaintiff would even include "aminosilane" and "phosphonium silane" chemical species expressly excluded by the limitation that "*the chemical species is not an aminosilane or a phosphonium silane.*"<sup>1</sup> Rather than support its arguments with intrinsic evidence, Plaintiff misdirects, relying heavily on the administrative ITC proceeding for this and other arguments. But "as CMC concedes, this Court is

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<sup>1</sup> All ***bold italic*** emphasis in Defendants' sections is added, unless otherwise indicated.

not bound by the ITC's holdings." D.I. 210 at 12; *see also Bio-Technology General Corp. v. Genentech, Inc.*, 80 F.3d 1553, 1564 (Fed. Cir. 1996) ("[T]he ITC's prior decision cannot have claim preclusive effect in the district court.").

Claim 26, the other independent claim, follows the same structure as claim 1 but lowers the minimum PPC to 13 mV and adds the requirement of an exterior coating of aminosilane bonded on the surface of the particle.<sup>2</sup> The patent's Detailed Description makes clear that in the claim 26 embodiments, the lower positive charge is of "the particles *prior to the surface treatment*." JCCC\_Ex. A-1, 7:56-64. This is also clear from the parallelism in the language of claims 1 and 26. Here too, Plaintiff evades the claim language and specification to argue that the required minimum positive charge need not come from the claimed internal chemical species.

Terms 1 and 5 relate to what should be straightforward claim language—an "outer surface"—defining an external boundary of the particle, distinct from its internal volume. Creating a dispute requiring resolution, Plaintiff, however, misreads the terms to convert chemical species located *within* a particle's interior volumes into chemical species bonded to its outer surface.

## 2. Person Of Ordinary Skill In The Art

The claims and specification relate to the use of colloidal silica particles in chemical-mechanical compositions (i.e., slurries). *See e.g.*, JCCC\_Ex. A-1, 1:54-58, 2:15-36. Accordingly, a person of ordinary skill in the art ("POSA") for the '721 patent should be defined as:

A POSA in the field of the '721 patent in the 2014 to 2015 time frame would have been someone with an advanced degree involving materials science, chemistry, applied physics, mechanical engineering, or the like, and at least two years of experience designing, developing, or researching in the field of CMP slurries and/or colloid science. Alternatively, that person would have had a bachelor's degree involving materials science, chemistry, applied physics, mechanical engineering,

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<sup>2</sup> As reflected in Term 4, claim 26 also does not exclude internal aminosilane and phosphonium silane chemical species. *Cf.* Term 2.

or the like, and at least three years of experience designing, developing, or researching in the field of CMP slurries and/or colloid science.

This definition is consistent with, *inter alia*, the background of the named inventors (e.g., Ex.8\_JA0469, QA6, (Ph.D. in chemistry), Ex.9\_JA0483, QA6, (Ph.D. in chemistry)) and the prior art. See *Daiichi Sankyo Co., Ltd. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007).

### **B. CMC's Reply Introduction<sup>3</sup>**

DuPont repeatedly replaces the patentees' chosen language with its own. In Terms 1 and 5, DuPont rewrites the straightforward term "outer surface" to include twenty-four words and unclaimed functional requirements. In Term 2, DuPont rewrites "wherein the chemical species is not" to be "~~the chemical species~~ colloidal silica abrasive particles...do not." And in Term 3, DuPont rewrites "the colloidal silica abrasive particles have a permanent positive charge of at least [15 or 13] mV" in two ways—(1) ignoring patentees' lexicography for PPC and (2) adding a phrase ("that results from the chemical species incorporated in the colloidal silica abrasive particles") that appears nowhere in the intrinsic record. DuPont's unsupported constructions should be rejected.

### **C. Defendants' Sur-Reply Introduction**

The patent and prosecution history describe the alleged invention as moving charge *inside* by "forming the colloidal silica abrasive particles having *a positive charge by incorporating a chemical species internal to the outer surface thereof*." JCCC\_Ex.A-2\_pg.95; JCCC\_Ex.A-1, 5:3-26. The common structure of claims 1 and 26 confirms that these internal chemical species are the only possible source of the minimum threshold PPC claimed. Rather than "replac[ing] the patentees' chosen language with its own" (§I.B), DuPont's constructions effectuate the intrinsic record, identifying the functional source of the threshold PPC in Term 3 and giving meaning to the colloidal silica particles

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<sup>3</sup> DuPont's Answer included an Introduction, contrary to the Scheduling Order's requirements. D.I. 93 ¶ 9. CMC responds here.

structures in Terms 1, 2, 4, and 5. Contradictorily, Plaintiff seeks to broaden its claims to encompass non-functional amounts of internal nitrogen species and what it knew to be (but withheld from the USPTO) pre-existing “[REDACTED]” Ex.28\_JA1117-18.

**II. AGREED-UPON CONSTRUCTIONS**

<b>Claim(s)</b>	<b>Claim Term/Phrase</b>	<b>Proposed Claim Construction</b>
1, 26	“A chemical mechanical polishing composition comprising”	Not limiting
1, 26	“about”	“approximately”
1, 26	“colloidal silica abrasive particles”	“colloidal silica abrasive particles that are prepared via a wet process rather than a pyrogenic or flame hydrolysis process which produces structurally different particles”
1, 26	“aminosilane”	“A compound having amine and silane functional groups”
1	“phosphonium silane”	“A compound having phosphonium and silane functional groups”

### III. **DISPUTED CONSTRUCTIONS**<sup>4</sup>

#### A. TERM 1: “outer surface” (Claims 1, 26)

CMC’s Construction	DuPont’s Construction
No construction needed. <i>See</i> Terms 2 and 4, which incorporate these words.  Alternatively, plain and ordinary meaning.	“the external silica surface of the colloidal silica abrasive particle available for surface treatment and/or abrasive contact with a substrate to be polished”

#### 1. CMC’s Opening Position

The parties dispute: (1) whether “outer surface” should be construed; and (2) if construed, its correct construction.

First, “outer surface” need not be separately construed because no controversy is resolved by its interpretation. *Vivid Tech., Inc. v. American Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”); *O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008); *Sciele Pharma Inc. v. Lupin Ltd.*, C.A. No. 09-0037-RBK/JS, 2011 WL 4351672, at \*10 (D. Del. Sept. 15, 2011) (declining to construe terms where party “gesture[d] to no live controversy that would require their construction”).

This is the ’721 Patent’s second claim construction.<sup>5</sup> At the ITC, DuPont did not propose to construe “outer surface.” Rather, DuPont said the “plain language” of “outer surface” was sufficient. Ex.5\_JA0452 (DuPont’s ITC Briefing) (“Claim 1, *by its plain language*, calls for colloidal silica

<sup>4</sup> DuPont disputes CMC’s definition of a POSA. Ex.40\_JA1445 (Validity Contentions). But the Court need not resolve this issue now, as none of the claim construction disputes depend on this definition.

<sup>5</sup> The ITC’s ’721 Patent claim construction applied the same Federal Circuit case law as at issue here; it is attached at Joint Appendix (“JA”), Ex.1\_JA0001-0336. DuPont did not appeal the ITC’s claim constructions to the Federal Circuit despite *de novo* review standard.

particles with a nitrogen or phosphorus containing compound internal to their *outer surface*....”).<sup>6</sup>

“Outer surface” did not need separate construction then, nor does it need one now.

Here, DuPont’s final non-infringement and invalidity contentions do not identify (and therefore waive) any dispute hinging on the meaning of “outer surface.” Even when CMC contended that the Accused Products include particles having “a chemical species incorporated ... internal to an *outer surface* thereof” under either parties’ construction, [REDACTED] [REDACTED] Ex.3\_JA0359–68, JA0384–92 (Infringement Contentions); Ex.4\_JA0412–20, JA0431–39 (Non-Infringement Contentions). Similarly, DuPont’s definition of “outer surface” is not relevant to validity—DuPont identified the “outer surface” for its anticipation, obviousness, and Section 112 contentions without using the definition it now advocates. *See, e.g.*, Ex.2\_JA0341 (Invalidity Contentions) (alleging “nitrogen containing compounds” “internal to an outer surface” without further explanation).

Second, if construed, “outer surface” should be given its plain and ordinary meaning. The term “involves little more than the application of the widely accepted meaning of commonly understood words.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (internal citations omitted). “Outer surface” is not defined in the ’721 Patent, and the inventors did not alter its scope by disclaimer or disavowal. Rather, the plain meaning of “outer surface” is used throughout the ’721 Patent. *E.g.*, JCCC\_Ex. A-1 (’721 Patent) at 14:55–62 (describing compound “internal to an *outer surface* of the particles”); 18:23–27 (“[A]minosilane compound is bonded with less than 4% of silanol groups on the *outer surface* of the colloidal silica particles.”). The ’721 Patent’s use of the term is also consistent with contemporaneous dictionaries. *Phillips*, 415 F.3d at 1314; Ex.6\_JA0460;

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<sup>6</sup> Emphasis added unless otherwise noted.



Ex.7\_JA0465 (defining “outer” as “being away from a center” and “further from the centre,” respectively) and Ex.6\_JA0461; Ex.7\_JA0466 (defining “surface” as “the exterior ...of an object or body” and “the outside part ...of something,” respectively) (Dictionaries). As there is no “contravening evidence” departing from the common meaning of this term, the “plain and unambiguous claim language controls the construction analysis.” *DSW, Inc. v. Shoe Pavilion, Inc.*, 537 F.3d 1342, 1347 (Fed. Cir. 2008).

By contrast, DuPont’s construction will confuse the jury. At twenty-four words long, it packs in two alternative functional clauses—“available for surface treatment” and/or “available for ... abrasive contact.” These functional clauses are not used anywhere in the ’721 Patent, let alone to define “outer surface,” and are improper to read into the claim. *See Ecolab, Inc. v. Envirochem, Inc.*, 264 F.3d 1358, 1367 (Fed. Cir. 2001) (“Where the function is not recited in the claim itself by the patentee, we do not import such a limitation.”); *Woods v. DeAngelo Marine Exhaust, Inc.*, 692 F.3d 1272, 1284 (Fed. Cir. 2012) (affirming refusal to read requirement into claim term to perform a function described in the specification).

## **2. Defendants’ Answering Position**

DuPont proposes construing “outer surface” as meaning:

The external silica surface of the colloidal silica abrasive particle available for surface treatment and/or abrasive contact with a substrate to be polished.

Plaintiff does not substantively dispute this construction, other than to argue that “[a]t twenty-four words long” it “will confuse the jury” and that the term need not be construed. §III.A.1\_pg.8. Its proposal—an undefined “plain and ordinary meaning” (§III.A.1\_pgs.6-7)—is no construction at all and insufficient to resolve the parties’ disputes. *O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1361 (Fed. Cir. 2008) (noting “‘plain and ordinary meaning’ may be inadequate when...[it] does not resolve the parties’ dispute”).

Plaintiff wrongly alleges that there is no need to construe the term “outer surface” because no controversy is resolved by its interpretation and DuPont has waived any arguments relating thereto. The need for an appropriate construction arises, for instance, from Plaintiff’s use of the term “outer surface” to include an interior particle volume distinct from its external surface. For example, characterizing Example 13 as having aminosilane “bonded with the outer surface” and as a working example of claim 1, Plaintiff conflates compounds located *within* the volume of an “outer shell” and compounds located *on* an “outer surface” as both being “bonded with the outer surface.” §III.E.1\_pg.77; CMC Final Validity Contentions §IX.D.1., 436, 442, 445-448. Inconsistent with Plaintiff’s usage of “outer surface,” Example 13 expressly describes growing an “outer silica shell **containing** the aminosilane,” not compounds bonded with the particle’s “outer surface.” JCCC\_Ex. A-1, 30:17-54; *see also id.*, 29:46-51.

As for DuPont’s construction, it is supported by the “words of the claim.” *Wi-Lan, Inc. v. Apple, Inc.*, 811 F.3d 455, 462 (Fed. Cir. 2016). The term “outer surface” appears once in claim 1 and twice in claim 26. It is used in the limitation “a chemical species incorporated in the colloidal silica abrasive particles internal to an **outer surface** thereof” in both claims and further used in the claim 26 limitation “an aminosilane compound is bonded with the **outer surface** of the colloidal silica abrasive particles.” Claim 37 adds that “the aminosilane compound is bonded with less than 4% of the silanol groups **on the outer surface** of the colloidal silica particles.” In all claimed contexts, the “outer surface” delineates the particle’s external boundary, e.g., the colloidal silica abrasive particle’s surface in contact with an external liquid carrier, substrate to be polished, or aminosilane to be bonded, distinguished from the particle’s interior volume. *See Chamberlain Grp., Inc. v. Lear Corp.*, 516 F.3d 1331, 1338-39 (Fed. Cir. 2008) (rejecting construction of the

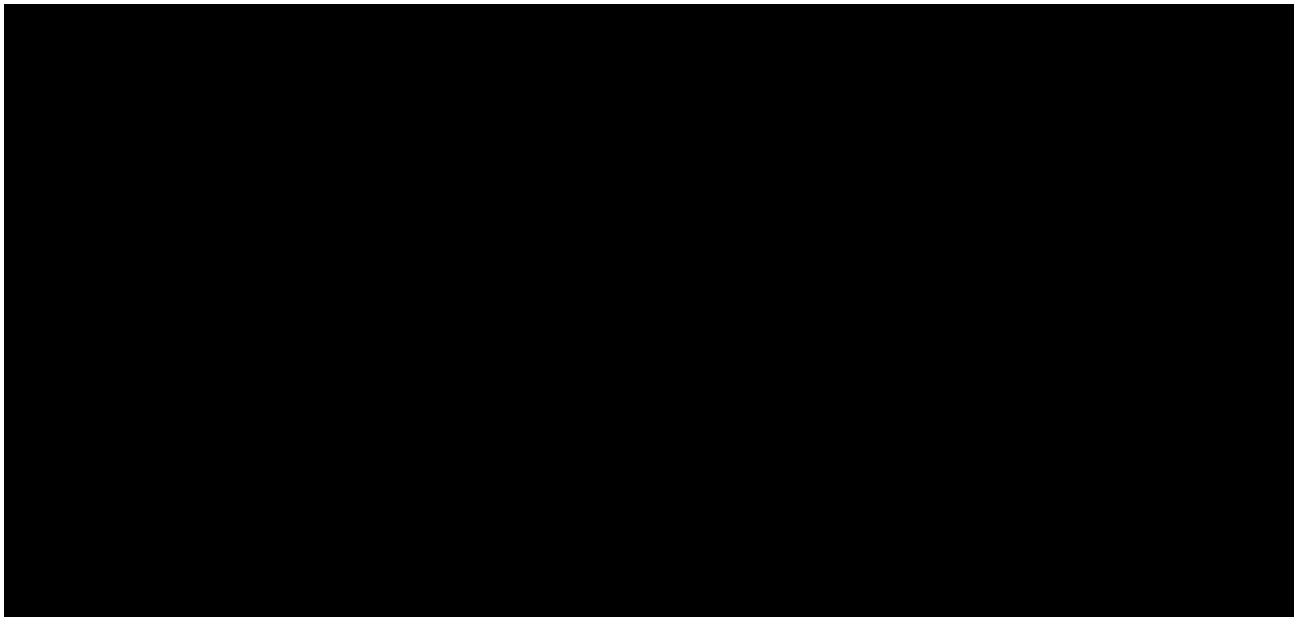
“binary code” that would encompass “trinary code” where “[t]he patent claims and specification...do not permit these two terms to overlap”).

Like the claim language, the specification distinguishes “treating an external surface” from the “incorporating the chemical species sub-surface in the interior of the particles,” i.e., within the volume of the particle. JCCC\_Ex. A-1, 5:3-26. It states that the former may involve “mask (or shield) the *particle surface* (e.g., the silanol and/or siloxane groups on the *surface*) such that the abrasive may not always have some of the same desirable properties as an untreated silica abrasive.” *Id.* The specification further distinguishes internal “positively charged chemical species” and “further bonding (*via surface treating*)... to the particle surface.” *Id.*, 7:33-37.

DuPont’s construction—“the *external silica surface* of the colloidal silica abrasive particle available for surface treatment and/or abrasive contact with a substrate to be polished”—also aligns with the use of colloidal silica particles in a CMP slurry, where chemical and physical interactions with the particle’s external surface are used to abrade and planarize semiconductor wafers. Ex. 13, JA0548-549, QAs 18-21; Ex. 14, JA0594-0596, QAs 73-79.

Directly refuting Plaintiff’s usage of an unconstrued “outer surface,” the specification unambiguously describes the “shell” as an “outer layer” having a thickness that can incorporate chemical species within its volume internal, distinct from chemical species being “bonded to the outer surface.” JCCC\_Ex. A-1, 6:37-53; *see also id.*, 17:25-29 (“An eighteenth embodiment... wherein the colloidal silica abrasive particles have a core-shell structure in which an *outer shell* is disposed over an inner core, *the chemical species being incorporated in the outer shell.*”). The difference between a particle “shell,” which has volume, and its “outer surface” is [REDACTED]

[REDACTED] internally incorporated within the thickness of the shell:



Plaintiff argues that “DuPont’s construction will confuse the jury.” §III.A.1\_pg.8. What would truly confuse a jury, however, would be Plaintiff relying on an unconstrued “ordinary meaning” to argue that being bonded to its “outer surface” includes species located within the interior volume of a particle’s shell. *See, e.g.*, JCCC\_Ex. A-1, 29:46-51, 30:33-37. As such, DuPont’s proposed construction is not only appropriate, but also necessary to avoid jury confusion.

### **3. CMC’s Reply Position**

DuPont’s Answer confirms that “outer surface” requires no construction apart from its plain and ordinary meaning. *First*, DuPont argues that construction is necessary but still does not identify any actual issue of infringement, invalidity, or otherwise resolved by its construction. *O2 Micro*, 521 F.3d at 1362. DuPont instead raises two unrelated questions: (i) how to distinguish “chemical species within [a shell’s] volume internal” from “chemical species being ‘bonded to the outer surface’” (§III.A.2\_pgs.10-11); and (ii) whether Example 13 discloses aminosilane “bonded with the outer surface” (§III.A.2\_pg.9). But construing “outer surface” is not required even for these issues.

Regarding issue (i), there is no claim construction dispute. DuPont alleges that CMC “conflates compounds located within the volume of an ‘outer shell’ and compounds located on an

‘outer surface’ as both being bonded with the outer surface.” §III.A.2\_pg.9. That is not CMC’s position. §III.A.1\_pgs.6-8, §III.E.1\_pg.77. Rather, CMC has consistently distinguished species located *internal* to the surface from those *at* the surface. Ex.36\_JA1338-39 (CMC 1204 PreHB)

\_\_\_\_\_) (citing JCCC\_Ex.A-1 at 5:21-41 and Ex.13\_JA0564 (CMC’s ITC Expert Testimony)); *see also* §III.B.1.a\_pgs.16-17; JCCC\_Ex.A-1 (Patent) at 30:17-54 (Example 13’s core shell structure has aminosilane throughout the shell layer, including *internal* to the outer surface and *bonded with the outer surface* of the particles); Ex.37\_JA1355 (same). If DuPont now agrees,<sup>7</sup> no dispute remains.

Issue (ii) does not depend on the construction of “outer surface” either. Example 13 discloses aminosilane bonded with the “outer surface” even under DuPont’s construction because the surface aminosilane is bonded to “the external silica surface...available for surface treatment.” §III.A.2\_pg.10 (citing JCCC\_Ex.A-1, 5:3-26); §III.A.1\_pgs.6-8. Specifically, in Example 13, aminosilane bonds to available silanol groups on the external silica surface, and those silanol groups are available for surface treatment. Ex.37\_JA1355 (CMC’s ITC Expert Testimony); Ex.39\_JA1377 (CMC Presentation). DuPont does not provide any explanation of “available for surface treatment” that would exclude this structure.

*Second*, even if construction of “outer surface” were necessary to resolve a dispute, DuPont provides no justification for deviating from the term’s plain meaning to add DuPont’s new functional language. *DSW*, 537 F.3d at 1347 (plain language controls absent “contravening evidence”). DuPont asserts its proposal “is supported by the words of the claim,” but the functional

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<sup>7</sup> DuPont, not CMC, previously conflated “internal to an outer surface” with “at” the outer surface. Ex.38\_JA1367 (DuPont 1204 PreHB) (arguing “that species at...the particle surface are considered to be internal”) (quotations omitted).

language DuPont seeks to add is undeniably *not* in the claim. §III.A.2\_pg.9. DuPont does not contend a POSA would have understood “outer surface” (a structure) to be defined functionally at all, much less using the functions that DuPont proposes. *Phillips*, 415 F.3d at 1313 (“[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a [POSA].”).

DuPont also argues its proposal is consistent with the specification’s description of “treating an external surface” and with exemplary “use[s] of colloidal silica particles in a CMP slurry.” §III.A.2\_pg.10. However, even if true, the Federal Circuit has repeatedly warned against importing examples into a claim. *Ecolab*, 264 F.3d at 1367 (“Where the function is not recited in the claim...we do not import such a limitation.”); *Woods*, 692 F.3d at 1284. Here, “the ordinary meaning of [“outer surface”] involves little more than the application of the widely accepted meaning of commonly understood words.” *Phillips*, 415 F.3d at 1314. Construction beyond the plain and ordinary meaning is not required.

#### 4. Defendants’ Sur-Reply Position

Plaintiff agrees “outer surface” should be given its plain and ordinary meaning yet evades articulating that meaning. §III.A.1; §III.A.3. Its argument that no construction is necessary is belied by the term’s use in all but one disputed term. Plaintiff’s continued characterization of Example 13 as an “aminosilane bond[ed] to available silanol groups *on the external silica surface*” (§III.A.3\_pgs.11-12) where the example instead references “colloidal silica particles having an outer silica *shell containing the aminosilane*” (JCCC\_Ex.A-1, 30:17-54) highlights the parties’ disagreement over and the need to construe “outer surface.”

Plaintiff’s argument that DuPont “deviate[es] from the term’s plain meaning” (§III.A.3\_pg.12) is particularly meritless as Plaintiff fails to identify any “plain meaning.” Rather than adding “deviating” functional language (*id.*), DuPont’s construction puts to words exactly

what the specification describes and is consistent with claims 1, 26, and 37 (Plaintiff does not address claim 37). *See* §III.A.2\_pgs.8-9. Indeed, Plaintiff does not dispute “available for surface treatment and/or abrasive contact with a substrate to be polished” reflects the function and purpose of the alleged invention to “alternatively... incorporat[e] certain positively charged chemical species into the abrasive particles” to avoid “the use of a surface treating agent [that] may mask (or shield) the particle surface....” JCCC\_Ex. A-1, 5:3-26.

The Court should adopt DuPont’s construction, especially given Plaintiff’s failure to offer any alternative.

**B. TERM 2 (Claim 1)**

“[a] a chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof, [b] wherein the chemical species is a nitrogen containing compound or a phosphorus containing compound; ... [c] wherein the chemical species is not an aminosilane or a phosphonium silane”

**1. CMC’s Opening Position**

Term 2 relates to a core concept of the ’721 Patent—a fundamentally different and innovative chemical mechanical planarization (CMP) slurry used for polishing wafers in advanced semiconductor processing. Before the ’721 Patent, traditional dielectric slurries required a high concentration of negatively charged particles and high pH—which achieved fast planarization and high removal rates, but at high cost and with unwanted scratching of semiconductor wafers. For years, the industry tried to solve these problems by adding positive charge to the outer surface of the particles and using low pH, without success. Ex.8\_JA0472–74 (Inventor ITC Testimony); Ex.9\_JA0483–84 (Inventor ITC Testimony); Ex.10\_JA0503–06 (CMC President ITC Testimony).

Only after years of failure did the ’721 Patent inventors conceive of a breakthrough solution—[REDACTED] Ex.8\_JA0473–74 (Inventor ITC Testimony); Ex.9\_JA0484 (Inventor ITC Testimony). By integrating particles with an internal chemical species in a slurry composition having a certain level of permanent positive charge, the ’721 Patent inventors achieved faster removal rates without scratching and with lower concentrations of abrasive particles, leading to lower cost. Ex.9\_JA0492–93 (Inventor ITC Testimony); Ex.8\_JA0473–74, JA0477 (Inventor ITC Testimony); Ex.10\_JA0506 (CMC President ITC Testimony). As DuPont admits, CMC’s D922x products, which practice the ’721 Patent, were [REDACTED] Ex.11\_JA0524 (DuPont ITC Deposition Testimony); *see also* Ex.12\_JA0536 (DuPont ITC Deposition Testimony).



CMC addresses Terms 2a, 2b, and 2c separately in the same way that both parties construed the terms at the ITC. DuPont's new "as a whole" approach distracts from the parties' disputes and leads to inconsistent or duplicative constructions.

**a. Subpart [2a]:**

“*[a]* a chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof, *[b]* wherein the chemical species is a nitrogen containing compound or a phosphorus containing compound ...*[c]* wherein the chemical species is not an aminosilane or a phosphonium silane” (Claim 1)

CMC's Construction	DuPont's Construction <sup>8</sup>
<p>“The recited chemical species is incorporated sub-surface in the interior of the colloidal silica abrasive particles”</p> <p>Note: In addition, a portion of the recited chemical species may also be at or near the particle surface (such that the chemical species is both internal to and at the surface).</p> <p>The claim may further include additional, unrecited chemical species outside the scope of this limitation.<sup>9</sup></p>	<p><b>“the colloidal silica abrasive particles contain within their outer surfaces</b> one or more nitrogen and phosphorous containing compounds but do not contain an aminosilane or phosphonium silane within their outer surfaces”</p> <p>NOTE: Defendants propose a construction of the claim phrase as a whole.</p>

The parties dispute whether “incorporated...internal to an outer surface thereof” should be construed as described in the specification, as CMC proposes, or should be rewritten to omit the concept of “internal” entirely and to change “outer surface” to “outer surfaces,” as DuPont suggests.

CMC's construction mirrors the specification, which explains that: (1) being internal to the outer surface of particles refers to “incorporating the chemical species sub-surface in

<sup>8</sup> CMC bolded portions of DuPont's construction for Terms 2a-2c to align the parties' positions. The bolding was not included in DuPont's construction. JCCC Ex. A at 3.

<sup>9</sup> This portion specifically applies to Term 2c and CMC addresses it there. CMC repeats it here only for completeness in view of DuPont's request to combine Terms 2a-2c into a single construction.

the interior of the particles” and (2) the internal incorporation of the chemical species does not preclude chemical species from also being at or near the surface of the particle:

One aspect of the invention is the realization that positively charged colloidal silica abrasive particles may alternatively be obtained via *incorporating certain positively charged chemical species into the abrasive particles (i.e., incorporating the chemical species sub-surface in the interior of the particles).* .... While the chemical species is incorporated internally in the colloidal silica abrasive particles, it will be understood that a portion of the chemical species may be at or near the particle surface (such that the chemical species is both internal to the surface and at the surface).

JCCC\_Ex. A-1 ('721 Patent) at 5:21–41; *see also id.* at 3:23–26. CMC’s construction retains the plain meaning of the term used in the specification. *See Kinik Co. v. Int’l Trade Comm’n*, 362 F.3d 1359, 1365 (Fed. Cir. 2004) (“The words of patent claims have the meaning and scope with which they are used in the specification and the prosecution history.”). CMC’s construction also is supported by extrinsic evidence, including expert testimony (Ex.13\_JA0563–64), and was adopted by the ITC in the 1204 Investigation (Ex.1\_JA0079–81).

DuPont’s proposal construes “incorporated...internal to an outer surface thereof” to mean “contain within their outer surfaces.” DuPont: (1) changes “outer surface” to “outer surfaces;” (2) replaces “incorporated in” with “contain within”—a term that is not used in the '721 Patent; and (3) reads out the concept of incorporating the species “internal” to the outer surface. DuPont provides no justification for these departures from the claim language and specification. *Retractable Techs., Inc. v. Becton, Dickinson & Co.*, 653 F.3d 1296, 1305 (Fed. Cir. 2011) (cautioning against “allow[ing] the claim language to become divorced from what the specification conveys”); *Phillips*, 415 F.3d at 1215 (“[S]pecification ‘is always highly relevant to the claim construction analysis.’”) (citation omitted).

**b. Subpart [2b]:**

“[a] a chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof, [b] wherein the chemical species is a nitrogen containing compound or a phosphorus containing compound ...[c] wherein the chemical species is not an aminosilane or a phosphonium silane” (Claim 1)

CMC’s Construction	DuPont’s Construction
<p>“The recited chemical species is a compound that contains nitrogen or phosphorous.”</p> <p>Note: The claims may further include additional, unrecited chemical species outside the scope of this limitation.</p>	<p>“the colloidal silica abrasive particles contain within their outer surfaces <b>one or more nitrogen and phosphorous containing compounds</b> but do not contain an aminosilane or phosphonium silane within their outer surfaces”</p> <p>NOTE: Defendants propose a construction of the claim phrase as a whole.</p>

CMC’s construction follows the language of the claim, which requires only *one* “chemical species” that contains nitrogen *or* phosphorous. The specification supports CMC’s construction. It explains that the chemical species is either nitrogen-containing “or” phosphorous-containing. *See, e.g.*, JCCC\_Ex. A-1 (’721 Patent) at 14:55–62 (“In one embodiment, a suitable concentrate includes ...a colloidal silica including a nitrogen-containing compound such as an aminosilane compound or a phosphorus-containing compounds such as a phosphonium silane compound incorporated internal to an outer surface of the particles.”). The ITC adopted CMC’s construction. Ex.1\_JA0081–82 (ID).

DuPont omits “chemical species” and rewrites “a nitrogen containing compound *or* a phosphorus containing compound” to “one or more nitrogen *and* phosphorous containing compounds.” A “nitrogen *and* phosphorous containing compound” is not required, but a “chemical species” (which DuPont omits) is expressly recited. DuPont’s construction contradicts the plain language of the claim.

## c. Subpart [2c]:

“[a] a chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof, [b] wherein the chemical species is a nitrogen containing compound or a phosphorus containing compound ...[c] wherein the chemical species is not an aminosilane or a phosphonium silane” (Claim 1)

CMC’s Construction	DuPont’s Construction
<p>“The recited chemical species is neither an aminosilane nor a phosphonium silane.”</p> <p>Note: The claims may further include additional, unrecited chemical species outside the scope of this limitation.</p>	<p><b>“the colloidal silica abrasive particles</b> contain within their outer surfaces one or more nitrogen and phosphorus containing compounds but <b>do not contain aminosilane or phosphonium silane within their outer surfaces”</b></p> <p>NOTE: DuPont proposes a construction of the phrase as a whole.</p>

The parties dispute whether it is specifically “the chemical species” that is “not an aminosilane or a phosphonium silane,” or whether this negative limitation applies to the particles as a whole. Only CMC’s construction is consistent with the plain language of the claim.

As the claim states, “the” previously recited chemical species cannot be aminosilane or phosphonium silane. This is a “comprising” claim, and as such imposes no restrictions on other chemical species that can exist in the particle. *See Vivid Techs.*, 200 F.3d at 811 (“The signal ‘comprising’ implements the general rule that absent some special circumstance or estoppel which excludes the additional factor, infringement is not avoided by the presence of elements or steps in addition to those specifically recited in the claim.”). So long as “the chemical species” is not an aminosilane or a phosphonium silane, there can also be aminosilane or a phosphonium silane in the particles.

The embodiments in the ’721 Patent explicitly support CMC’s construction: “[i]t will be understood that the colloidal silica abrasive particles may include *two or more of the above described chemical species* incorporated in the particles,” including an aminosilane species and a non-aminosilane species, such as a quaternary amine. JCCC\_Ex. A-1 (’721 Patent) at 4:59–

65; *see also id.* at 39:19–43 (Example 13 describing a particle with both 3-ethyloxypropylamine (“EOPA”)—a non-aminosilane nitrogen containing compound—and an aminosilane). The prosecution history also describes that it is “the chemical species” that cannot be aminosilane or phosphonium silane. JCCC\_Ex. A-2 at 95.

CMC’s expert in the 1204 Investigation testified that [REDACTED]

[REDACTED]

[REDACTED] Ex.13\_JA0567

(CMC’s ITC Expert Testimony). Even DuPont’s expert agreed that a particle can include other chemical species and satisfy the claim. Ex.1\_JA0084 (ID) (DuPont’s expert agrees that “yes,” the claim “can include other species that aren’t even recited in this claim.”).

DuPont simply ignores “the chemical species” limitation and requires that the particles *as a whole* do not contain aminosilane or phosphonium silane. DuPont’s construction contradicts the plain claim language, the intrinsic and extrinsic evidence, and basic canons of claim construction on antecedent basis and the open-ended transitional phrase “‘comprising’ [which] creates a presumption that...the claim does not exclude additional, unrecited elements.” *Crystal Semiconductor Corp. v. TriTech Microelectronics Int’l, Inc.*, 246 F.3d 1336, 1348 (Fed. Cir. 2001); *NCR Corp. v. Documotion Rsch., Inc.*, C.A. No. 14-395-GMS, 2015 WL 6697251, at \*6 n.22 (D. Del. Nov. 3, 2015) (a claim term with the indefinite article “a” suggests that later references with the definite article “the” refer to the same term).

## 2. Defendants' Answering Position

### a. DuPont's construction accurately tracks the intrinsic evidence.

Applying the principle that the claim construction “inquiry is not limited to an analysis of [a] phrase in isolation,”<sup>10</sup> the Term 2 limitations should be construed as a whole to mean:

The colloidal silica abrasive particles contain within their outer surfaces one or more nitrogen or phosphorous containing compounds but do not contain an aminosilane or phosphonium silane within their outer surfaces.<sup>11</sup>

With the two “wherein” clauses properly “[r]ead together,” the claimed colloidal silica abrasive particles necessarily *include* at least one nitrogen- or phosphorous-containing chemical species and necessarily *exclude* aminosilane and phosphonium silane compounds. *Innovative Memory Systems, Inc. v. Micron Technology, Inc.*, 781 Fed. App’x 1013, 1016 (Fed. Cir. 2019) (“The relationship is defined in the claim. Indeed, it is described in the ‘wherein’ clause directly before the disputed limitation.”); *see also Kruse Technology Partnership v. Volkswagen AG*, 544 Fed. App’x 943, 949 (Fed. Cir. 2013).

Starting with the words of the claims, “**a** chemical species incorporated in the colloidal silica” necessarily encompasses “**one or more** chemical species.” This follows from the “general rule” of claim construction and the patent’s express definition. JCCC\_Ex. A-1, 39:25-30 (“The use of the terms ‘a’ and ‘an’ and ‘the’... are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context.”); *ABS Glob., Inc. v. Cytonome/St, LLC*, 84 F.4th 1034, 1040-41 (Fed. Cir. 2023) (relying on patent’s definition of “a” as “one or more” to reinforce the general rule that “a” includes the plural). Like the claims, where

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<sup>10</sup> *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 792 (Fed. Cir. 2021).

<sup>11</sup> DuPont has clarified its construction to recite “nitrogen **or** phosphorous containing compounds.”

there are multiple incorporated compounds, the specification describes *each*—including aminosilane compounds specifically—as incorporated “chemical species.” JCCC\_Ex. A-1, 4:59-5:2 (“[C]olloidal silica abrasive particles may include ***two or more*** of the above described ***chemical species incorporated*** in the particles. For example...***a first incorporated chemical species may include an aminosilane compound....***”), 6:11-14 (“***The chemical species...may include*** any one or more of the species described above, but most preferably includes ***an aminosilane compound.***”). What this means is that the negative limitation—“wherein the chemical species is not an aminosilane or phosphonium silane”—applies equally to *each* of the “one or more” chemical species in the colloidal silica particles.

Excluding aminosilane and phosphonium silane compounds is reinforced and necessitated by the prosecution history. *Fenner Investments, Ltd. v. Cellco P’ship*, 778 F.3d 1320, 1325 (Fed. Cir. 2015). During prosecution, the USPTO rejected Plaintiff’s claims over the “Fu” reference (US Patent Application Publication 2015/0267081), which teaches:

***A permanent positive charge may be the result, for example, of incorporating a cationic compound on and/or in the particle.*** The cationic compound may include, for example, a metal cation, a nitrogen containing compound ***such as an amine***, and/or a ***phosphonium compound***.

JCCC\_Ex. A-2, 136, (¶18). In response, Plaintiff conceded that “Fu teaches that ***the cationic compound may include...a nitrogen-containing compound*** such as an amine or a phosphonium compound” but then distinguished Fu as “***not exclude[ing] an aminosilane or phosphonium silane, as required by the pending claims.***”<sup>12</sup> JCCC\_Ex. A-2, 95. The USPTO relied on this distinction, quoting the negative “wherein” limitation in the reasons for allowance. JCCC\_Ex. A-

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<sup>12</sup> Plaintiffs misrepresented Fu—which teaches “***[a] permanent positive charge may be the result, for example, of incorporating a cationic compound [such as an amine] on and/or in the particle***” (JCCC\_Ex. A-2, 136)—as “***not teach[ing] amine compounds incorporated in the colloidal silica abrasive particles internal to an outer surface thereof.***” *Id.*; JCCC\_Ex. A-2, 95.

2, 106; *Kaken Pharm. Co. v. Iancu*, 952 F.3d 1346, 1352-54 (Fed. Cir. 2020) (limiting claim scope based on applicant’s “statements during prosecution, followed by the examiner’s statements”).

**b. Plaintiff’s proposed construction contradicts both intrinsic and extrinsic evidence.**

Plaintiff does not dispute that the two “wherein” clauses (§III.B.1.b-c) both relate back to the “chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof” (§III.B.1.a) and that the incorporated “chemical species” cannot be an aminosilane or phosphonium silane compound (§III.B.1.c). However, Plaintiff’s construction “note” that “[t]he claims may further include additional, unrecited chemical species outside the scope of this limitation” is a backdoor to include the expressly excluded aminosilane and phosphonium silane compounds. *See* §III.B.1.c\_pg.3. Indeed, while conceding that aminosilane and phosphonium silane compounds are “chemical species,” Plaintiff nevertheless argues that there are “***no restrictions*** on other chemical species that can exist in the particle.” *Id.*, 10. This is irreconcilable with its arguments distinguishing *Fu* as “***not exclud[ing] an aminosilane*** or phosphonium silane [from within the particles], ***as required by the pending claims.***” JCCC\_Ex. A-2, 95; *Baxter Diagnostics Inc. v. PB Diagnostic Sys., Inc.*, 57 F.3d 1082, 1995 WL 253177, at \*5 (Fed. Cir. 1995) (rejecting argument that failed to address “prosecution history, much less attempt to reconcile [it] with this litigation-induced claim interpretation”).

Plaintiff’s argument that there are “***no restrictions*** on other chemical species that can exist in the particle” because the preamble uses the “comprising” transition term (§III.B.1.c\_pg.19) is further foreclosed by extensive Federal Circuit guidance that “[c]omprising’ is not a weasel word with which to abrogate claim limitations.” *Spectrum Int’l., Inc. v. Sterilite Corp.*, 164 F.3d 1372, 1380 (Fed. Cir. 1998). While the “comprising” transition may allow additional unrecited elements following the preamble, it does not permit fundamental alteration of the recited claim elements



and “does not reach into each of the...steps to render every word and phrase therein open-ended.”<sup>13</sup> *Dippin’ Dots, Inc. v. Mosey*, 476 F.3d 1337, 1343 (Fed. Cir. 2007); *see also Outside the Box Innovations, LLC v. Travel Caddy, Inc.*, 695 F.3d 1285, 1305 (Fed. Cir. 2012) (“[C]omprising...does not change the elements that are stated in the claim.”). Here, use of “comprising” in the preamble here does not open the colloidal silica particles to include the expressly excluded aminosilane and phosphonium silane chemical species.

A similar overbroad construction was rejected in *Jeneric/Pentron, Inc. v. Dillon Co., Inc.*, where patent owner attempted to read “comprising” 0–1% of cerium oxide on an accused product containing 1.61% of cerium oxide. 205 F.3d 1377, 1382-83 (Fed. Cir. 2000). The Federal Circuit soundly rejected patent owner’s argument that the first 0.92% of cerium oxide was within the claimed 0–1% range and the remaining 0.69% was allowed for by the “comprising” transition, because “it would read out of claim 1 the express claim ranges.” *Id.* Similarly, Plaintiff’s construction improperly relies on “comprising” to read out the “the chemical species is not an aminosilane or a phosphonium silane” limitation and place “***no restrictions*** on other chemical species that can exist in the particle.” §III.B.1.c\_pg.19.

Plaintiff’s reliance on the specification to include expressly excluded chemical species (§III.B.1.c\_pg.19) is misplaced. As a preliminary matter, the statement that “the colloidal silica abrasive particles may include ***two or more of the above described chemical species*** incorporated

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<sup>13</sup> The “comprising” cases on which Plaintiff relies similarly address only that *the body* of the claims are open to additional elements without any implication that each individual element is “open” to modification. *E.g., Vivid Techs., Inc. v. Am. Sci. & Engr., Inc.*, 200 F.3d 795, 811 (Fed. Cir. 1999) (“The signal ‘comprising’ implements the general rule that... infringement is not avoided by the presence ***of elements or steps in addition*** to those specifically recited in the claim,”); *Crystal Semiconductor Corp. v. TriTech Microelectronics Int’l, Inc.*, 246 F.3d 1336, 1348 (Fed. Cir. 2001) (“When a patent claim uses the word ‘comprising’ as its transitional phrase, the use of ‘comprising’ creates a presumption that ***the body of the claim is open.***”).

in the particles” (*id.* at 10-11, quoting ’721 Patent, 4:59–65) in context reflects that aminosilane and phosphonium silane compounds are “chemical species” and thus within the meaning of the negative “wherein” limitation. JCCC\_Ex. A-1, 4:45-58.

Plaintiff’s reliance on alternative embodiments such as Example 13—which it characterizes as a particle having both aminosilane and non-aminosilane internal chemical species—does not support a construction contrary to the claim language and prosecution history.

*See* §III.B.1.c\_pg.20 As observed in *August Tech. Corp. v. Camtek, Ltd.*,

[t]he mere fact that there is an alternative embodiment disclosed in the asserted patent that is not encompassed by our claim construction does not outweigh the language of the claim, especially when the court’s construction is supported by the intrinsic evidence. ***This is especially true where, as here, other unasserted claims in the parent patent cover the excluded embodiments.***

655 F.3d 1278, 1285 (Fed. Cir. 2011) (citations, quotations, and alterations omitted). Like *August Tech.*, “unasserted claims” that expressly incorporate aminosilane chemical species are found in other Plaintiff’s patents with the same Example 13 and common priority. *See, e.g.*, Ex. 16, JA0763-0787 (29:55-30:25, claim 1); Ex. 17, JA0788-0812 (29:15-51, claim 1).

For all reasons stated above, DuPont’s construction correctly excludes aminosilane and phosphonium silane compounds from being internal to the outer surface of the colloidal silica abrasive particles.

### 3. CMC's Reply Position

#### a. Subparts [2a] and [2b] (Claims 1 and 26)

DuPont purportedly construes Term 2 “as a whole,” but addresses only subpart c, which is only recited in claim 1. §III.B.2.a\_pg.21. DuPont does not address subparts a and b of Term 2—which are identical to Term 4 and found in both claims 1 and 26—other than to acknowledge that its construction was wrong. *Id.* at 21 n.11 (revising construction).

#### b. Subpart [2c] (Claim 1)

The parties dispute whether it is “the chemical species” that is “not an aminosilane or a phosphonium silane,” or, as DuPont proposes, whether this negative limitation applies to the internal portion of the particles as a whole. DuPont acknowledges that the negative limitation “relate[s] back to the chemical *species*,” §III.B.2.b\_pg.23, yet DuPont rewrites the claim to require that the “*particles*...do not contain aminosilane or phosphonium silane within their outer surfaces.” §III.B.2.a\_pg.21.

DuPont makes three arguments for rewriting the claim.

- (1) The two “wherein” clauses in Term 2 “read together” mean the entire particles rather than the recited “chemical species” “exclude aminosilane and phosphonium silane” (*id.*);
- (2) “a chemical species” “necessarily encompasses ‘one or more chemical species’” and the negative limitation “applies equally to each of the ‘one or more’ chemical species” (*id.* at 21-22); and
- (3) the prosecution history allegedly supports DuPont’s construction (*id.* at 22-23).

First, regarding the “wherein” clauses, DuPont cites cases that do not justify its position. *Id.* at 6. In *Innovative Memory* and *Kruse Technology* the claims had terms with the definite article “the,” which had not been previously introduced with the indefinite article “a,” requiring the court to read the elements of the claim together to give effect to the definite article. 781 Fed. App’x at 1016 (“[C]laims requires ‘the correspondence.’”) (emphasis in original); 544 Fed. App’x at 950

(“[D]efinite article (‘the’), indicat[es] a particular combustion.”). Term 2 does not share this infirmity. Moreover, both parties agree the “wherein” clauses relate back to the “chemical species” (§III.B.2.b\_pg.23); there is no basis for ignoring that limitation and applying the negative limitation to the whole internal portion of the particle.

Second, DuPont’s argument relying on “a” encompassing “one or more” is also misplaced. §III.B.2.a\_pgs.21-22. The term “a” is not limited to a single item, but neither does it *require* multiple items. *Siemens Mobility, Inc. v. Iancu*, 825 F. App’x 867, 872 (Fed. Cir. 2020) (“[R]equir[ing] multiple...[would] eliminate the option of one...encompassed by the use of the article ‘a.’”). Here, “a” in claim 1 means *the* “one or more” chemical species is not an aminosilane or a phosphonium silane—not that *all* chemical species in the particle must exclude such material.

Indeed, in *Silicon Graphics*, the Court rejected the proposition that claim language modifying an element introduced with the indefinite article “a” should be construed to modify *all* of such elements, rather than simply “one or more” of the elements. 607 F.3d at 789-91. The lower court construed “a rasterization process which operates on a floating point format,” to mean the “[rasterization] process *as a whole* operates on a floating point format” and granted summary judgment of non-infringement for accused products that included both floating point and fixed point rasterization processes because the products thus did not operate on a floating point format “as a whole.” *Id.* at 789-90. The Federal Circuit reversed because the proper claim construction was that “one or more of the rasterization processes...operate on a floating point format,” not that “all rasterization processes must operate on a floating point format.” *Id.* at 790-91.

Here too, claim 1 is satisfied if one species is not an aminosilane, regardless of the presence of other species in the particle. *Id.* This is exactly what the patent describes. *See, e.g.,*

JCCC\_Ex.A-1 at 4:59-65 (“[P]articles may include two or more...chemical species.”), 39:19-43 (Example 13); §III.B.1.c\_pgs.19-20.

Finally, DuPont mischaracterizes the prosecution history, which does not support DuPont’s position, let alone meet the “exacting standard” required to limit claim scope. *Cont’l Circuits LLC v. Intel Corp.*, 915 F.3d 788, 798 (Fed. Cir.) (citing *Thorner v. Sony Computer Entm’t Am. LLC*, 669 F.3d 1362, 1367 (Fed. Cir. 2012)). Specifically, DuPont omits entire portions of the applicants’ statements to suggest that “Plaintiff conceded” that “Fu” teaches an internal cationic compound and only “distinguished Fu as ‘not *exclude[ing]* [sic] *an aminosilane or phosphonium silane, as required by the pending claims.*’” §III.B.2.a\_pgs.22-23 (emphasis in original). But that half-sentence merely paraphrases the claim and DuPont blatantly ignores the actual context. The entire excerpt shows that applicants discussed the cationic compound in the context of “a covalent interaction” and, as shown in yellow below, repeatedly *distinguished* Fu as not disclosing *any* internal chemical species. JCCC\_Ex.A-2\_pgs.95-98. Since applicants explained that Fu does not even disclose an internal chemical species,<sup>14</sup> they can hardly have made a “clear and unmistakable disclaimer” relating to whether the non-existent internal chemical species is not an aminosilane or phosphonium silane. *Thorner*, 669 F.3d at 1367.

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<sup>14</sup> DuPont argues that Fu discloses an internal chemical species. §III.B.2.a\_pg.22 n.12. It does not; Fu, another CMC patent that is not prior art to the ’721 Patent (35 U.S.C. § 102 (b)(2)(C)), uses the same PPC definition as the ’721 Patent but does not disclose embodiments with internal chemical species. JCC\_Ex.A-2\_pgs.133-37.

Applicants respectfully disagree. Fu teaches a CMP composition including colloidal silica particles having a permanent positive charge of at least 6 mV. Fu teaches that a permanent positive charge may result, for example, from a covalent interaction between the particle and the cationic compound and is in contrast to a reversible positive charge that may result, for example, of an electrostatic interaction between the particle and the cationic compound. Fu then describes how to determine a permanent positive charge. Fu states that components that are strongly associated with the particle surface remain on the surface such that there tends to be little if any change in the positive zeta potential of the particle. Fu does not teach a chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof. Furthermore, Fu teaches that the cationic compound may include a metal cation, a nitrogen-containing compound such as an amine, or a phosphonium compound. Fu does not teach amine compounds incorporated in the colloidal silica abrasive particles internal to an outer surface thereof, and does not exclude an aminosilane or phosphonium silane, as required by the pending claims.

JCCC\_Ex.A-2\_pg.95. DuPont also is wrong that the Examiner “relied on this distinction.” §III.B.2.a\_pg.22-23. The Examiner did not mention it and merely paraphrased the claim language. JCCC\_Ex.A-2\_pg.106. DuPont’s incomplete prosecution history excerpt falls far short of the disclaimer standard. *Thorner*, 669 F.3d at 1367.

DuPont’s other arguments do not justify its rewritten claim scope. §III.B.2.b\_pgs.23-25. For example, DuPont argues that the “note” included in CMC’s construction is “a backdoor to include the expressly excluded aminosilane.” §III.B.2.b\_pg.23. But whether called a “note” or not, CMC’s construction reflects the plain meaning of these comprising claims; so long as “the chemical species” is not an aminosilane or phosphonium silane, there can also be aminosilane or a phosphonium silane in the particles. §III.B.1.c\_pgs.19-20; *CollegeNet, Inc. v. ApplyYourself, Inc.*, 418 F.3d 1225, 1235 (Fed. Cir. 2005) (“[T]he use of ‘comprising’ suggests that additional, unrecited elements are not excluded.”).

DuPont’s cases do not change this straightforward conclusion regarding “comprising” terms. §III.B.2.b\_pgs.23-25. *Spectrum* involved clear prosecution disclaimer, 164 F.3d at 1379, which does not exist here. *Dippin’ Dots* applied the accepted principle that in a comprising claim

“an infringing process could practice other steps in addition to the ones mentioned,” 476 F.3d at 1343—exactly as in CMC’s construction. In *Outside the Box Innovations*, the unrecited element contradicted the claims. 695 F.3d at 1305 (unrecited element—plywood—“*removed* the flexibility of” a claimed “flexible fabric front panel”). And in *Jeneric/Pentron*, plaintiff tried to expand the claimed range of 0–1% to cover a product containing 1.61% of material, effectively negating the range. 205 F.3d at 1383.

Here, by contrast, presence of an aminosilane or a phosphonium silane internal to the particle does not alter *the* claimed chemical species in the particle. Indeed, Example 13 expressly discloses a particle that both includes an internal aminosilane *and* another chemical species. JCCC\_Ex.A-1 (Patent) at 4:59-65, 39:19-43. DuPont, not CMC, seeks to “abrogate claim limitations” and “fundamental[ly] alter[]” the claim by applying the negative limitation to the particles as a whole. *Contra* §III.B.2.b\_pgs.23-24.

Finally, DuPont argues its construction prohibiting *any* aminosilanes in the particle is supported by *other* CMC patents that claim particles with aminosilanes. §III.B.2.b\_pg.25. But DuPont overstates the holding of *August Tech.*, which simply found that the language of the claim outweighs alternative embodiments. 655 F.3d at 1285. It did not create a rule that the existence of unasserted claims compelled the exclusion of embodiments where, as here, the plain claim language covers those embodiments. *Id.*

DuPont has no support for rewriting the claim language, and its construction should be rejected.

#### 4. Defendants' Sur-Reply Position

Plaintiff's argument that the negative "wherein" limitation does not exclude aminosilane and phosphonium silane (§III.B.3\_pgs.26-28) fails for multiple reasons.

First, *Innovative Memory* explains that a "wherein" clause defines a relationship in a claim (781 Fed. App'x at 1016) and *Kruse Technology* explains that "terms of a relevant limitation when read together indicate the meaning of the limitation itself" (544 Fed. App'x at 949). These cases guide reading the present "wherein" clauses as complementary, together defining what is included and excluded from within the particles. §III.B.2.a\_pgs.21-22. Plaintiff does not meaningfully dispute those holdings—agreeing the "'wherein' clauses relate back to the 'chemical species'"—instead resorting to an irrelevant analysis regarding the difference between "the" and "a" claim language.<sup>15</sup> §III.B.3.b\_pgs.26-27.

Second, Plaintiff concedes that "a" chemical species means "one or more" chemical species but relies on *Silicon Graphics* to argue that the negative limitation *does not* apply to each of the "one or more" chemical species. §III.B.3.b\_pg.27. In *Silicon Graphics*, however, the claimed process that required a "floating" point rasterization process had no negative limitation excluding distinct "fixed" point rasterization. 607 F.3d 790-91. Contrarily, aminosilanes, phosphonium silanes, and all other nitrogen and phosphorus containing compounds are all "chemical species" according to the '721 patent—not analogous to *Silicon Graphics*'s mutually exclusive "fixed" vs "floating" distinction—and the negative limitation here—not present in *Silicon Graphics*—expressly excludes aminosilane and phosphonium silane chemical species. §III.B.2.a\_pg.22, (*citing* JCCC\_Ex.A-1, 4:59-5:2, 6:11-14). Plaintiff's argument also fails to address embodiments

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<sup>15</sup> Plaintiff's positions on other DuPont cited caselaw (§III.B.3.b\_pgs.21-22) were already addressed in DuPont's answering brief (§III.B.2.b\_pgs.23-25; §III.C.2\_pgs.42-43) and not meaningfully rebutted.



in which—consistent with DuPont’s construction—“the first chemical species is ammonium and the second chemical species is a quaternary amine,” i.e., multiple internal “chemical species” where none are aminosilane or phosphonium silanes. JCCC\_Ex.A-1, 4:59-5:2.

Third, Plaintiff—not DuPont—mischaracterizes the prosecution history. §III.B.3.b\_pgs.28-30; §III.B.2.a\_pgs.21-23. Plaintiff’s invitation to include more context does not change that it distinguished the alleged invention over Fu by relying on the negative limitation as unconditionally excluding aminosilanes and phosphonium silanes:

compound. Fu does not teach amine compounds incorporated in the colloidal silica abrasive particles internal to an outer surface thereof, and does not exclude an aminosilane or phosphonium silane, as required by the pending claims.

§III.B.3.b\_pg.29 (copying JCCC\_Ex.\_A-2\_pg.95 (yellow highlights from Plaintiff, blue highlights from DuPont)). And, while not necessary for the analysis, Plaintiff is mistaken to argue that Examiner did not rely on these arguments:

***Allowable Subject Matter***

1. Claims 1-46 are allowed.
2. The following is an examiner's statement of reasons for allowance:  
 With respect to claim 1, applicants' arguments on pages 10-14 of the reply filed on 5/18/2016 are persuasive because the applied art of record fails to disclose or render obvious a CMP composition wherein: “the chemical species is a nitrogen containing compound and is not an aminosilane or a phosphonium silane” in addition to other composition contents as defined in the applicants independent claim 1.

JCCC\_Ex.\_A-2\_pg.106 (highlights added); §III.B.3.b\_pg.29; *Microsoft Corp. v. Multi-Tech Sys., Inc.*, 357 F.3d 1340, 1350 (Fed. Cir. 2004) (“[A] patentee’s statements during prosecution, whether relied on by the examiner or not, are relevant to claim interpretation.”).

Finally, Plaintiff argues that the prosecution history “falls far short of the disclaimer standard.” §III.B.3.b\_pg.29. But DuPont has not argued disclaimer, instead explaining that construction of the negative limitation is informed by “critical” prosecution history. §III.B.2\_pgs.21-25; §III.C.2\_pgs.42-43; *see also U. of Massachusetts v. L’Oreal S.A.*, 36 F.4th 1374, 1379 (Fed. Cir. 2022) (prosecution history “may be critical” to claim construction even where not rising “to the level of unmistakable disavowal”).

**C. TERM 3 (Claims 1, 26):**

“a chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof, wherein the chemical species is a nitrogen containing compound or a phosphorus containing compound

...

[b] wherein the colloidal silica abrasive particles have [a] a permanent positive charge of at least [15 or 13] mV”

**1. CMC’s Opening Position**

Consistent with both parties’ positions in the 1204 Investigation, CMC proposes constructions for two elements from this limitation, “a permanent positive charge of at least [15 or 13] mV” and “wherein the colloidal silica abrasive particles have a permanent positive charge of at least [15 or 13] mV.”

To avoid its failed construction from the 1204 Investigation, DuPont now refers to the whole claim limitation instead of the portions relevant to the parties’ dispute. Below, CMC addresses the actual disputed portions.

**a. Subpart [3a]**

wherein the colloidal silica abrasive particles have *[a]* a permanent positive charge of at least [15 or 13] mV

CMC's Construction	DuPont's Construction <sup>16</sup>
<p>“positive charge of at least [15 or 13] mV that is not readily reversible, for example, via flushing, dilution, filtration, and the like.”</p> <p><u>Note:</u> The recited permanent positive charge values are measured according to the three step procedure described at column 11 of the '721 Patent specification: “A permanent positive charge of a specified value [at least N mV] means that the zeta potential of the colloidal silica particles remains above that specified value after the following three step filtration test: A volume of the polishing composition (e.g., 200 ml) is filtered through a Millipore Ultracell regenerated cellulose ultrafiltration disk (e.g., having a MW cutoff of 100,000 Daltons and a pore size of 6.3 nm). The remaining dispersion (the approximately 65 ml of dispersion that is retained by the ultrafiltration disk) is collected and replenished with pH adjusted deionized water. The deionized water is pH adjusted to the original pH of the polishing composition using a suitable inorganic acid such as nitric acid. This procedure is repeated for a total of three filtration cycles. The zeta potential of the triply filtered and replenished polishing composition is then measured and compared with the zeta potential of the original polishing composition. This three step filtration test is further illustrated by way of example in Example 10 of the '721 Patent.”</p>	<p>“the colloidal silica abrasive particles have a <b>positive zeta potential of at least [15 or 13] mV that is not readily reversible, for example, via flushing, dilution, filtration, and the like</b>, and that results from the chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof”</p> <p>NOTE: Defendants propose a construction of the claim phrase as a whole.</p>

<sup>16</sup> As in Term 2, CMC has bolded portions of DuPont's construction for Terms 3a and 3b to align the parties' positions. The bolding was not included in DuPont's construction. See JCCC\_Ex. A at 5-6.

CMC proposes that “permanent positive charge of at least [15 or 13] mV” means “positive charge of at least [15 or 13] mV that is not readily reversible, for example, via flushing, dilution, filtration, and the like,” because the specification requires that the recited permanent positive charge be measured according to the three-step test described at column 11 of the ’721 Patent. DuPont selectively truncates this express definition by entirely omitting the three-step test for measuring permanent positive charge, and replaces the term “charge” with “zeta potential.”

Only CMC’s construction is consistent with the specification. The three-step filtration test incorporated in CMC’s construction is in the express definition in the specification. *See* JCCC\_Ex. A-1 (’721 Patent) at 11:4–6 (“*By permanent positive charge it is meant that the positive charge on the silica particles is not readily reversible, for example, via flushing, dilution, filtration, and the like.*”); 11:14–31 (“*Notwithstanding, as used herein, a permanent positive charge of at least 6 mV means that the zeta potential of the colloidal silica particles remains above 6 mV after the following three step filtration test...*”).

These statements are an express definition that delineates the scope of the claims to require that the permanent positive charge be measured by the recited test. *Braintree Labs., Inc. v. Novel Labs., Inc.*, 749 F.3d 1349, 1356 (Fed. Cir. 2014) (finding that the part of the specification stating “The terms ‘clinically significant’ *as used herein are meant to convey...*” to be a clear definition and holding “[u]nder our precedent, the patentee’s lexicography must govern the claim construction analysis. Therefore, we disagree with the district court’s modification of the clear language found in the specification.”) (citations omitted); *accord* Ex.1\_JA0070 (ID) (ITC determining that these statements are an express definition that requires permanent positive charge be measured by the recited test).

DuPont’s construction is unsupported. First, DuPont replaces the term “charge” with “zeta potential.” The two terms are related, but different; here “charge” can be “permanent” whereas “zeta potential” depends, *e.g.*, on pH and conductivity. Ex.13\_JA0578 (CMC’s ITC Expert Testimony). Second, DuPont omits the three-step filtration test that the inventors designed to quantify the permanent positive charge. Ex.13\_JA0577; *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998) (describing the “situation in which a patent applicant has elected to be a lexicographer by providing an explicit definition in the specification for a claim term” and finding that, “[i]n such a case, the definition selected by the patent applicant controls”). And the ITC found that DuPont’s proposal “is based on the conclusory opinions of their expert.” Ex.1\_JA0070–71 (ID).

**b. Subpart [3b]:**

*[b]* wherein the colloidal silica abrasive particles have a permanent positive charge of at least [15 or 13] mV

CMC’s Construction	DuPont’s Construction
“the colloidal silica abrasive particles in the chemical mechanical polishing composition have a permanent positive charge of at least [15 or 13] mV.”	<b>“the colloidal silica abrasive particles have a positive zeta potential</b> of at least [15 or 13] mV that is not readily reversible, for example, via flushing, dilution, filtration, and the like, and <b>that results from the chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof</b> ”

First, the parties dispute what sources of permanent positive charge should be included in the measurement. CMC proposes that the permanent positive charge is measured as the particles exist in the claimed “chemical mechanical polishing composition,” and so covers charge from the internal chemical species as well as charge from any aminosilane bonded to the outer particle surface. DuPont limits the source of the permanent positive charge to “the chemical species

incorporated in the colloidal silica abrasive particles internal to an outer surface thereof,” *i.e.*, DuPont excludes any charge from external aminosilane or other sources.

Second, the parties dispute<sup>17</sup> whether the permanent positive charge must be measured for the group of particles in the polishing composition, as claimed, or for individual particles within the group, as DuPont argues in its non-infringement contentions.

On both points, only CMC’s construction is supported by the claims and specification, as explained below and as found by the ITC. Ex.1\_JA0068–79 (ID).

**i. The Claim Covers Permanent Positive Charge from Internal Chemical Species and Externally Bonded Aminosilane**

Claim 26 identifies at least two sources of permanent positive charge—an internally incorporated chemical species and an externally bonded aminosilane. JCCC\_Ex. A-1; *see also* Ex.1\_JA0072 (ID). Claim 1 does not separately require an externally bonded aminosilane, but also does not exclude it. *Id.* The “permanent positive charge” term in both claims should therefore be construed to account for both acknowledged sources of permanent charge (internally incorporated and externally bonded). *Id.*; *Phillips*, 415 F.3d at 1314 (“[C]laim terms are normally used consistently throughout the patent.”). CMC’s construction reflects the plain language of this term.

CMC’s construction also flows directly from the specification, which states that a “permanent positive charge may be the result of incorporating the positive charged species in the particle” and “***may further result*** from a covalent interaction between the particle and a positively charged species... [i.e., external surface treatment].” JCCC\_Ex. A-1 at 11:6–10; *see also id.* at 11:45–48 (“Components that are in the particle or are strongly associated (e.g., covalently bonded)

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<sup>17</sup> Ultimately, this dispute is not dispositive of any issue in the case, as CMC has proven (and will prove) infringement under either position. Ex.3\_JA0359–68, JA0384–92 (Infringement Contentions).

with the particle surface remain with the particle such that there tends to be little if any change in the positive zeta potential thereof.”), 7:33–37 (“Positively charged colloidal silica abrasive particles may alternatively be obtained via incorporating a positively charged chemical species into the abrasive particles and then further bonding (via surface treating) the same or a different chemical species to the particle surface.”).

Expert testimony from both parties at the ITC further supports CMC’s construction. Ex.1\_JA0073 (ID) (citing expert testimony). CMC’s expert explained that the “sources” of positive charge in the claims include “the chemical species incorporated in the colloidal silica abrasive particles and also the aminosilanes that are bounded to the outer surface of the particle.” *Id.* DuPont’s expert agreed that the specification does “*not* indicate that the threshold value comes from inside,” but rather says that “there are species that could be covalently bonded to the surface and they would further increase the positive charge” and “because they are bonded to the surface, they’re permanent.” *Id.*

DuPont’s construction, on the other hand, seeks to import a functional requirement—that the internal chemical species be the sole source of permanent positive charge. But the Federal Circuit is clear: “[w]here the function is not recited in the claim itself by the patentee, we do not import such a limitation.” *Ecolab*, 264 F.3d at 1367. The “function” that DuPont seeks to add—that the claimed permanent positive charge “results from” only the internal chemical species—is explicitly contradicted by the specification. For example, the specification describes that “prior to the surface treatment” the zeta potential of particles “may be *less than 15 mV* (e.g., less than 13 mV or less than 10 mV) at a pH of 4.” JCCC\_Ex. A-1 (’721 Patent) at 7:62–67. These particles are then combined with an “aminosilane compound bonded to the surface” (*id.*), which “would get you above the threshold,” as CMC’s expert explained in the 1204 Investigation. Ex.1\_JA0074 (ID)



(citing expert testimony). DuPont’s expert also conceded this was disclosed in the specification. *Id.* CMC’s expert further explained the benefit of this structure is that “you are moving some of the charge to the interior and you don’t have to put as much charge on the surface” and “you get these advantages of having more of the surface available for the chemical-mechanical planarization.” Ex.1\_JA0074–75 (ID) (citing expert testimony).

Example 15 provides a working example of a composition in which the colloidal silica particles had a zeta potential of 10 or fewer mV before surface treatment, and a zeta potential of well over the claimed 15 mV threshold after surface treatment. JCCC\_Ex. A–1 (’721 Patent) at 32:57–33:42 (compositions 15D-15G); *see also* Ex.1\_JA0075 (ID). At the ITC, DuPont’s expert agreed that particles with this structure would be expected to have permanent positive charge and DuPont admitted that these are embodiments to which claim 26 refers. Ex.1\_JA0075 (ID). Thus, DuPont’s construction that the permanent positive charge results only from the internally incorporated species improperly excludes preferred embodiments. *See GE Lighting Sols., LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1311 (Fed. Cir. 2014) (“[W]here claims can reasonably [be] interpreted to include a specific embodiment, it is incorrect to construe the claims to exclude that embodiment, absent probative evidence on the contrary.”) (citation omitted).

**ii. The Term Does Not Require Measurement of Individual Particle Components Outside of the Composition**

CMC’s position is straightforward. Permanent positive charge is a characteristic of colloidal silica abrasive particles in a polishing composition at a specific pH and thus is measured across all the particles in a sample of the polishing composition. This is reflected in the claim language, which recites a “composition” comprising colloidal silica abrasive particles with a specific pH of the polishing composition (’721 Patent at claims 1, 26), as well as in the specification, which defines “permanent positive charge” as a measurement of a *composition*.

JCCC\_Ex. A-1 ('721 Patent) at 10:38–39 (“The colloidal silica abrasive particles may optionally have a permanent positive charge in the polishing composition.”). Indeed, the required “three step filtration test” for “permanent positive charge” is described as being performed on a “volume of the polishing composition.” *Id.* at 11:14–17, 11:27–28 (describing comparison between zeta potentials of “the triply filtered and replenished polishing composition” and “the original polishing composition”).

DuPont, on the other hand, would require that *individual* nano-sized particles be measured depending on whether that particle has an internal chemical species. Ex.4\_JA0428–30, JA0445–47 (Non-Infringement Contentions). But claims 1 and 26 simply require that the same claimed group of particles (plural) have both an internally incorporated chemical species and the claimed minimum permanent positive charge—they do not specify a particle-by-particle assessment of the sources of that positive charge. JCCC\_Ex. A-1 ('721 Patent) at Cls. 1, 26. Indeed, nothing in the specification says that either the internal “chemical species” or the “permanent positive charge” is measured particle-by-particle. To the contrary, the specification describes permanent positive charge as a characteristic of a *composition* (JCCC\_Ex. A-1 ('721 Patent) at 10:38–11:28) and repeatedly states that chemical species are measured as a concentration—a molar ratio—in the *composition*. *E.g., id.* at 3:66–4:3 (“a molar ratio of the chemical species to silica in the colloidal silica abrasive particles...”), 21:7–22 (Table 2 reporting “Nitrogen level” concentration in a “Polishing Composition”), 20:48–53 (dissolving all particles in the composition to determine concentration).

## 2. Defendants' Answering Position

DuPont proposes this clause from claims 1 and 26, which is relevant to both invalidity and noninfringement, should be construed as a whole to mean:<sup>18</sup>

The colloidal silica abrasive particles have a positive zeta potential of at least [15 or 13] mV that is not readily reversible, for example, via flushing, dilution, filtration, and the like, and that results from the chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof.

Importantly, as construed and consistent with the record, the claimed minimum PPC of 13 or 15 mV “*results from*” the nitrogen or phosphorous containing chemical species incorporated internally to the colloidal silica particles.

As a preliminary matter, Plaintiff manufactures a non-existent claim construction dispute. §III.C.1.b\_pg.37-38. DuPont’s proposed construction does not require measuring each colloidal silica particle individually, as Plaintiff asserts. *Id.* Plaintiff’s distortion relates to an infringement issue, where Plaintiff improperly relied on the [REDACTED]

Plaintiff’s reliance on this [REDACTED] ZP is inconsistent with the claims’ express requirement that “*the* colloidal silica abrasive particles in the liquid carrier [having] a chemical species incorporated”—[REDACTED]—“have a permanent positive charge of at least [15 or 13] mV.” Ex. 4, JA0428-430, 0445-447. But Plaintiff’s failure of proof is irrelevant at this stage. *See HSM Portfolio LLC v. Fujitsu Ltd.*, No. CV 11-770-RGA, 2014 WL 2754734, at \*3 (D. Del.

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<sup>18</sup> While this term can be construed, the required quantitative “charge” or “zeta potential” value is indefinite due to significant uncertainty arising from the measurement instrument and calculation method employed, neither of which is defined in the ‘721 patent or its claims. *See Bombardier Recreational Prods. Inc. v. Arctic Cat Inc.*, 785 F. App’x 858, 867 (Fed. Cir. 2019) (Construable term “still indefinite if a person of ordinary skill in the art cannot translate the definition into meaningfully precise claim scope.”) (quoting *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1251 (Fed. Cir. 2008)).

June 17, 2014) (“There is no canon of claim construction that prefers an ‘easy to prove infringement’ construction.”).

**a. “Permanent positive charge” and “charge” are defined in the specification.**

The “permanent positive charge” term was crafted by Plaintiff for its patents and is not a term of art. The specification first explains that:

The colloidal silica abrasive particles may optionally *have a permanent positive charge* in the polishing composition. *The charge* on dispersed particles such as colloidal silica particles *is commonly referred to in the art as the zeta potential* (or the electrokinetic potential).

JCCC\_Ex. A-1, 10:38-42. It then provides an express definition:

*By permanent positive charge it is meant* that the positive charge on the silica particles is not readily reversible, for example, via flushing, dilution, filtration, and the like.

*Id.*, 11:4-6. This express definition is controlling. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316

(Fed. Cir. 2005) (“[T]he inventor’s lexicography governs.”). Taken together, “permanent positive charge” in claims 1 and 26 thus means:

A positive zeta potential of at least [15 or 13] mV that is not readily reversible, for example, via flushing, dilution, filtration, and the like.

Plaintiff asserts that DuPont’s construction referencing “ZP” instead of “charge” is incorrect. § III.C.1.b.i\_pg.38. But the specification is clear: “*charge*” in the context of PPC “*is commonly referred to in the art as the zeta potential*.” JCCC\_Ex. A-1, 10:38-42. Indeed, *all* PPC values are reported in ZP units of millivolts (mV) and not the separate and distinct units of coulomb (C) that measure “charge” per its ordinary meaning. *See, e.g., id.* at 10:54-58, 11:14-31, Examples 2, 3, 6-8, 10-13, 15-17, 19, 20, claims 1, 26; Ex. 18, JA0813-0815 at 102:9-18 (“Charge is in coulombs; zeta potential is in millivolts.”). Especially since charge *cannot* be measured in the mV

units used throughout the specification and claims, Plaintiff provides no basis to contradict its own lexicography.

Other than “charge” vs. “ZP,” Plaintiff apparently agrees with DuPont’s construction except that Plaintiff adds yet another “note.” This “three-step filtration test” “note” is inappropriate, confusing, and contrary to law. If Plaintiff intended PPC to be limited to this three-step filtration, it and the patent should have said so expressly. But they do not. Plaintiff’s “note” should be rejected as it will only serve to sow jury confusion.

To the extent Plaintiff’s construction includes its “note” as a limitation, it improperly imports a specific “6-mV” embodiment as if it were a general definition. §III.C.1.a\_pgs.35-37, citing JCCC\_Ex. A-1, 11:14-16 (“a permanent positive charge of at least 6 mV means”). Much like *Silicon Graphics, Inc. v. ATI Techs., Inc.*,

[t]he specification does not suggest that the patentee intended to make that [6 mV] embodiment of [PPC] coextensive with the claims. Elsewhere, the specification defines [PPC] without reference to [a three step filtration test]....Those more general statements trump the definition found in the embodiment on which [Plaintiff] relied.

607 F.3d 784, 792-93 (Fed. Cir. 2010).

The 6-mV test is expressly exemplary as opposed to definitional. *E.g.*, JCCC\_Ex. A-1, 11:11-31 (“*e.g.*, 200 ml,” “*e.g.*, having a MW cutoff of 100,000 Daltons,” “using *a suitable* inorganic acid”). Reinforcing that the 6-mV test is not definitional, it states, as quoted in Plaintiff’s “note,” that the “test is further illustrated below *by way of example* (in Example 10)” which in turn implements the test differently from the “note.” JCCC\_Ex. A-1, 11:30-31, 28:1-56 (e.g., 41-mV PPC for 10B based on “[c]orrected zeta-potential values of the triply ultra-filtered and replenished polishing composition 10B were obtained *after adding KCl* to correct for ionic strength differences”). It would be error to “go[] beyond [the specification’s] explicit definition [of PPC]

to” incorporate the incomplete exemplary 6-mV embodiment. *Hyperphrase Techs., LLC v. Google, Inc.*, 260 Fed. App’x 274, 279 (Fed. Cir. 2007).

**b. The permanent positive charge results from the internally incorporated chemical species.**

**i. DuPont’s Construction**

DuPont’s construction that the PPC “results from” the incorporated nitrogen- or phosphorus-containing chemical species follows from the words of the claim. It also reflects the alleged invention as described in the specification and prosecution history, as well as testimony from named inventors. And DuPont’s proposed construction provides the only possible distinction over prior art particles that Plaintiff was not entitled to claim.

Claim 1 calls for colloidal silica particles with a nitrogen or phosphorus containing compound internal to their outer surface “wherein the colloidal silica abrasive particles have a permanent positive charge of at least 15 mV.” As was the case in *Alere, Inc. v. Rembrandt Diagnostics, LP*, “[t]his [‘wherein’] clause includes functional language that informs us of the structural requirements of the claim.” 791 Fed. App’x 173, 177-178 (Fed. Cir. 2019). That is, “the wherein clause [creates] a functional limitation for structural relationships of the” composition that should be read together with the complementary chemical species limitation. *Id*; see also *K-2 Corp. v. Salomon S.A.*, 191 F.3d 1356, 1363 (Fed. Cir. 1999) (reading “two clauses as complementary”).

For claim 1 to be meaningful, the claimed minimum PPC must result from the “chemical species incorporated in the colloidal silica abrasive particles.” Otherwise, it would lack essential features: the source of the claimed minimum PPC property and the amount of internal species required. Indeed, unless it provides a functional requirement for the amount of recited incorporated chemical species, the PPC limitation would “add[] nothing to the patentability or substance of the

claim.” *Texas Instruments Inc. v. U.S. Intern. Trade Commn.*, 988 F.2d 1165, 1172 (Fed. Cir. 1993).

The specification reinforces that PPC ***results from*** the internally incorporated chemical species. As recognized in the specification, the prior art already contained positively charged colloidal silica particles prepared by treating their ***external*** surface with aminosilane. *See* JCCC\_Ex. A-1, 5:3-10. By contrast, the alleged innovation was:

the realization that positively charged colloidal silica abrasive particles may alternatively be obtained via ***incorporating certain positively charged chemical species into the abrasive particles.***

*Id.*, 5:21-24; *see also id.*, 5:26-28 (“particles having an ***internal chemical species that provides*** a positive charge may be fabricated”); *id.*, 11:6-8 (“A permanent positive charge may be the ***result of incorporating*** the positive charged species ***in*** the particle.”).

The antecedent language for claim 1 similarly describes incorporating internal chemical species “***such that*** the colloidal silica abrasive particles have a positive charge of at least 15 mV.” *Id.*, 2:18-26; *see also id.*, Abstract, 3:53-56. That the claimed minimum PPC ***results from*** the internally incorporated species is the only construction consistent with this text in the specification. *See Medrad, Inc. v. MRI Devices Corp.*, 401 F.3d 1313, 1319 (Fed. Cir. 2005) (“It is therefore entirely proper to consider the functions of an invention in seeking to determine the meaning of particular claim language.”); *Kaken*, 952 F.3d at 1352 (Fed. Cir. 2020) (“A patent’s statement of the described invention’s purpose informs the proper construction of claim terms.”).

Similarly linking the claimed minimum PPC to the internally incorporated chemical species, the specification describes use of a somewhat lower PPC resulting from internally incorporated chemical species in combination with surface treatment. JCCC\_Ex. A-1, 7:56-8:3. This entails particles having a “low level of the internal chemical species” that provide a “zeta potential of the particles ***prior to the surface treatment***” of “less than 15 mV (e.g., less than 13

mV or less than 10 mV) at a pH of 4,” to which an aminosilane surface treatment is subsequently applied. *Id.* Like the specification’s description corresponding to claim 1, the minimum PPC here **results from** the internally incorporated chemical species independent of the effects of surface treatment, i.e., the minimum PPC is “**prior to** the surface treatment.” *Id.*

This lower PPC “prior to the surface treatment” embodiment is reflected in claim 26, which tracks claim 1, except lowering the minimum PPC resulting from the internal chemical species to at least 13 mV and adding a later and separate limitation directed to bonding an aminosilane compound to the outer surface of the colloidal silica abrasive particles:

<p><b>1.</b> A chemical mechanical polishing composition comprising:</p> <ul style="list-style-type: none"> <li>a water based liquid carrier;</li> <li>colloidal silica abrasive particles dispersed in the liquid carrier;</li> <li>a chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof, wherein the chemical species is a nitrogen containing compound or a phosphorus containing compound;</li> <li>a pH in a range from about 3.5 to about 6;</li> <li>wherein the colloidal silica abrasive particles have a permanent positive charge of at least 15 mV; and</li> <li>wherein the chemical species is not an aminosilane or a phosphonium silane.</li> </ul>	<p><b>26.</b> A chemical mechanical polishing composition comprising:</p> <ul style="list-style-type: none"> <li>a water based liquid carrier;</li> <li>colloidal silica abrasive particles dispersed in the liquid carrier;</li> <li>a chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof, wherein the chemical species is a nitrogen containing compound or a phosphorus containing compound;</li> <li>a pH in a range from about 1.5 to about 7;</li> <li>wherein the colloidal silica abrasive particles have a permanent positive charge of at least 13 mV; and</li> <li>wherein an aminosilane compound is bonded with the outer surface of the colloidal silica abrasive particles.</li> </ul>
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In both claims, antecedent for the PPC limitation is the same “the colloidal silica abrasive particles” having chemical species incorporated therein. *Credle v. Bond*, 25 F.3d 1566, 1571 (Fed. Cir. 1994) (considering “grammatical structure and syntax”). As in the specification, the surface bonded “aminosilane compound” in claim 26 is an additional element different from “the colloidal silica abrasive particles having a permanent positive charge of at least 13 mV” that is measured in accordance with the specification “**prior to the surface treatment.**” JCCC\_Ex. A-1, 7:56-8:3. In other words, for both claims, the claimed minimum PPC is functionally related to (results from) the same “colloidal silica abrasive particles” having chemical species incorporated therein prior to



any optional or claimed surface treatment.<sup>19</sup> See *Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1342 (Fed. Cir. 2001) (claim terms “should be construed consistently”).

The clear import of the claims and specification is that the minimum PPC resulting from internal chemical species needs to be at least 15 mV or as low as 13 mV if supplemented with an exterior aminosilane coating. This conclusion is further reinforced by disclosures in CMC’s own prior art US Patent 7,994,057 reporting PPC values resulting from aminosilane coating in the significantly higher range of 30-40 mV. JCCC\_Ex. A-2, 110-120 (p. 118); *see also* Ex. 19, JA0824 (¶ 23), JA0835 (Example 5); Ex. 20, JA0888-889 (Examples B-1 and B-2). To suggest in that context, as CMC does, that claim 26 means that the total PPC *following* aminosilane supplementation can be 13 mV—less than half the PPC disclosed in the prior art—strains credulity.

The prosecution history confirms the claimed minimum PPC necessarily *results from* the internally incorporated chemical species. See *Fenner*, 778 F.3d at 1325; *Biovail Corp. Int’l v. Andrx Pharms., Inc.*, 239 F.3d 1297, 1301 (Fed. Cir. 2001). The originally filed provisional application included broad claims to particles containing internal nitrogen or phosphorus species with *no* PPC limitation (claim 2) and others, such as claims 7, 8, and 9, claiming minimum PPC of 8, 10, or 13 mV, respectively. JCCC\_Ex. A-2, 21(¶33), 56-57. Lower PPC minima are also included in the later filed non-provisional specification, where particles with internal charge as low as 13 or 10 mV prior to aminosilane coating are described. JCCC\_Ex. A-1, 7:62-64.

Upon filing the non-provisional application leading to the ’721 patent, Plaintiff abandoned claims to the use of particles with internal nitrogen species but no PPC limitation and those with

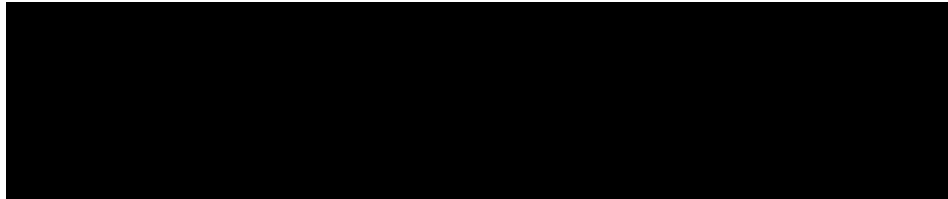
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<sup>19</sup> Contrary to what Plaintiff argues (§III.C.1.b.i\_pgs.38-39), DuPont’s construction does not ignore that an externally bonded aminosilane can provide *additional* PPC. Rather, DuPont’s construction simply identifies the internal chemical species as the source of the *minimum* 13 or 15 mV PPC required by the claims and described in the specification and prosecution history.

with internal nitrogen species and PPC as low as 10 mV in favor of narrower claims requiring PPC of at least 13 mV for particles with internal nitrogen species prior to aminosilane coating. *See* JCCC\_Ex. A-2, 10-62 (pgs. 48-60), 85-99 (pgs. 87-94). That pattern of initially disclosing and claiming more broadly but then claiming more narrowly reflects a dedication to the public of the broader unclaimed subject matter. *See Schriber-Schroth Co. v. Cleveland Tr. Co.*, 311 U.S. 211, 218 (1940) (holding that claims “are to be read in the light of those abandoned and an abandoned claim cannot be revived and restored to the patent by reading it by construction into the claims which are allowed”); *see also Nite Glow Idus., Inc. v. Central Garden & Pet Co.*, 2020-1897, 2020-1983, 2021 WL 2945556 (Fed. Cir. Jul. 14, 2012) (citing *Schriber-Schroth* and affirming that claim re-written to recite “rubber” disavowed coverage of “plastic”); *Sage Prods., Inc. v. Devon Indus., Inc.*, 126 F.3d 1420 (Fed. Cir. 1997) (“between [] patentee who had [] clear opportunity to negotiate broader claims but did not do so, and the public...[] patentee [] must bear the cost of its failure to seek protection for []foreseeable alteration[s] of its claimed structure”).

Beyond the foregoing, and as discussed for Term 2 above, the '721 Patent claims were rejected over Fu. JCCC\_Ex. A-2, 95, 136 (¶ 17). In response, Plaintiff admitted that “Fu teaches a CMP composition including colloidal silica particles having a permanent positive charge of at least 6 mv” but distinguished its alleged invention as being based on “forming the colloidal silica abrasive particles having ***a positive charge by incorporating a chemical species internal to the outer surface thereof.***” JCCC\_Ex. A-2, 95 *Wi-LAN USA, Inc. v. Apple Inc.*, 830 F.3d 1374, 1390 (Fed. Cir. 2016) (“A patentee cannot make representations about claim language during prosecution to avoid prior art and then escape these representations when trying to show infringement.”).

The extrinsic evidence also supports that the claimed minimum PPC must result from the one or more internal chemical species. According to named inventor Dr. Dysard, his “aha” moment was:



Ex. 8, JA0473-474; *AbbVie Inc. v. Mathilda & Terence Kennedy Inst. Of Rheumatology Tr.*, 764 F.3d 1366, 1377 (Fed. Cir. 2014) (affirming construction supported by inventor’s testimony consistent with intrinsic evidence).

At bottom, the overwhelming weight of the intrinsic evidence, confirmed by relevant extrinsic evidence, supports DuPont’s construction that the claimed minimum PPC must be a result of the one or more *internal* chemical species.

**ii. Plaintiff’s proposed construction contradicts both intrinsic and extrinsic evidence.**

Cherry-picking excerpts from the specification and the ALJ’s ITC opinion, Plaintiff contends that the *claimed* minimum PPC can be result from *unclaimed* structures including externally bonded aminosilane that “Claim 1 does not separately require.” §III.C.1.b.i\_pg.38. This construction would allow for incorporation of only trace amounts of internal nitrogen-species—having no function—with minimum PPC supplied entirely by the prior art aminosilane surface treatments. Ex. 21, JA0894-0898, 165:6-14 (Plaintiff’s expert testifying that [REDACTED] [REDACTED]). This is irreconcilable with claim 1, where the only source for the “permanent positive charge of at least 15 or mV” is the previously recited chemical species incorporated within the colloidal silica particle.

Plaintiff's construction is also irreconcilable with the prior art problems addressed by the alleged invention. Distinguishing positively charged, externally treated prior art particles, the specification represents:

One aspect of the invention is the realization that positively charged colloidal silica abrasive particles *may alternatively be obtained* via incorporating certain positively charged chemical species into the abrasive particles (i.e., . . . in the interior of the particles).

JCCC\_Ex. A-1, 5:3-26. The patent's distinction is entirely lost under Plaintiff's construction, where the charge need not be "alternatively [] obtained" by internally incorporated chemical species. *Tech. Patents LLC v. T-Mobile (UK) Ltd.*, 700 F.3d 482, 494 (Fed. Cir. 2012) (rejecting broader construction as contrary "to the heart of the invention's alleged improvement over the prior art"); *KEYnetik, Inc. v. Samsung Elecs. Co.*, 837 F. App'x 786, 792-93 (Fed. Cir. 2020) (Rejecting claim construction that would "eviscerate the stated purpose of the claimed invention."); *see also Spectrum Intern., Inc. v. Sterilite Corp.*, 164 F.3d 1372, 1378-79 (Fed. Cir. 1998).

Plaintiff makes much of the language in claim 26 that *additionally* requires an aminosilane bonded to the outer surface of the colloidal silica abrasive particles. Claim 26, however, does not attribute the claimed minimum PPC to the *combination* of internally incorporated species and an external coating, and does not divorce the internal chemical species from its minimum PPC function. *See supra*, §III.C.2.b.i. Nor can claim 26 be used to compel a construction of the PPC limitation inconsistent with its usage in claim 1. *Rexnord Corp.*, 274 F.3d at 1342.

As reflected in Plaintiff's own prior patent distinguished in the '721 specification, completely different linguistic constructs are used to attribute charge to a particle following an external coating. *See* JCCC\_Ex. A-2, 119 (U.S. Patent No. 7,994,057) (Claim 4, "***The polishing composition of claim 1, wherein the colloidal silica particles having a surface which has been***

*treated with the aminosilane compound have a zeta potential of 5 mV or greater.*”); JCCC\_Ex. A-1, 5:3-5 (citing U.S. Patent No. 7,994,057). Plaintiff thus knew how to attribute ZP to a particle’s external treatment but chose not to here.

Plaintiff also argues that requiring claimed minimum PPC to result from the internally incorporated chemical species would improperly exclude one sub-example, compositions 15D-G, where “the colloidal silica particles had a zeta potential of 10 or fewer mV before surface treatment.” §III.C.1.b.i\_pg.40; JCCC\_Ex. A-1, 7:62-67. That patents may disclose some unclaimed embodiments is neither unusual nor material to a proper claim construction. *TIP Sys., LLC v. Phillips & Brooks/Gladwin, Inc.*, 529 F.3d 1364, 1373 (Fed. Cir. 2008) (“The mere fact that there is an alternative embodiment disclosed in the [asserted patent] that is not encompassed by [our] claim construction does not outweigh the language of the claim, especially when the court's construction is supported by the intrinsic evidence.”). *GE Lighting Sols., LLC v. AgiLight, Inc.*, cited by Plaintiff (§III.C.1.b.i\_pg.40), is inapposite as the construction rejected there would have “*exclude[d] the specification's only disclosed embodiment.*” 750 F.3d 1304, 1311 (Fed. Cir. 2014). Indeed, as noted below, there are numerous unclaimed embodiments disclosed in the ’721 patent, and good reasons apparent from the extrinsic evidence why they should not have been claimed.

The consistent extrinsic evidence relates principally to the fact that the prior art imposed substantial limits on what Plaintiff was entitled to claim. The inventors’ initial litigation position was that the invention lay in putting the positive charge inside the particle rather than on the outside, as was customary in the art. Ex. 8, JA0473-474. But Fuso was already making and selling such particles, including “HL” and “BS” particles, and promoting them to slurry manufacturers

including [REDACTED] Plaintiff [REDACTED]. Ex. 22, JA0917; Ex. 23, JA0945-0981; Ex. 24, JA0994; Ex. 25, JA1011-1080.

Fuso actually made a number of the particles with internal charge described in the patent, including [REDACTED]  
[REDACTED]  
[REDACTED]. Ex. 26, JA1095; Ex. 27, JA1108-1112 (46:8-11, 68:19-69:2). Plaintiff drafted claims 1 and 26 with a minimum PPC threshold of 13 mV, excluding anticipation by the Fuso-supplied compositions [REDACTED]  
[REDACTED] particles that have ZPs less than 13 mV, as shown below.

Example 2 *** TABLE 2						
Polishing Compo- sition	Nitrogen Level (mmol/g SiO <sub>2</sub> )	Conduc- tivity (μs/cm)	Particle Size (nm)	Zeta Poten- tial (mV)	3 psi TEOS Rate (Å/min)	5 psi TEOS Rate (Å/min)
2A	0.19	190	49	8	3250	4030
2B	0.21	288	48	12	2990	3900
2C	0.18	214	48	17	2900	4430
2D	0.20	217	48	18	2860	3940
2E		439	53	4	1690	2890
2F		528	57	4	1680	1130
Control 1	<0.02	4127	140	-40	2760	4100
Control 2			69	29		1620
Control 3	<0.02		25	-14	39*	NA

Ex. 26, JA1095 (annotations added); JCCC\_Ex. A-1, 15 (Table 2) (annotations added). Thus, Plaintiff's contention regarding exclusion of disclosed embodiments initially falters on the fact, apparent from the patent text, that many disclosed examples are not claimed in the '721 patent.

As it had for Example 2 (JCCC\_Ex. A-1 20:26-21:35), [REDACTED]  
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Plaintiff's limitation of all its claims to use of particles with an internal charge of greater than 13 mV prior to any coating excluded anticipation by these commercial scale Fuso BS-2H particles,<sup>20</sup> [REDACTED]. Ex. 32, JA33, JA1267-1280; Ex. 33, 107:7-109:6, 134:10-18 ([REDACTED]); Ex. 34, JA1303, 1316, 1322. *See Gentex Corp. v. Donnelly Corp.*, 69 F.3d 527, 530 (Fed. Cir. 1995) (holding construction of "solution-phase" to properly exclude "solid films" where, *inter alia*, the inventor testified "he did not intend to include solid film"). Moreover, Plaintiff had agreed that Fuso's [REDACTED]

[REDACTED]

[REDACTED]

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<sup>20</sup> Plaintiff had disclosed BH-2H "marketed by Fuso" as "suitable colloidal silica" particles in another contemporaneous patent application and [REDACTED] prior to 2015, belying any notion that these particles were not on sale and in the prior art. Ex. 25, JA 1077, 1079; Ex. 35, JA1329 [¶15].

Ex. 28, JA1117-1118. Although Plaintiff did not disclose these prior art Fuso particles during prosecution, [REDACTED]. In this context, these prior art Fuso particles are relevant in assessing claim scope. *Harris Corp. v. IXYS Corp.*, 114 F.3d 1149, 1153 (Fed. Cir. 1997) (rejecting patentee's proposed claim construction because it would read on the prior art).

Adoption of the same claim format for claims 1 and 26, that required the PPC of at least 13 mV to come from the internal nitrogen compound, also kept both claims from anticipation by [REDACTED]. And that is [REDACTED] (patent data below, right), belatedly added to the disclosure a year after the original filing. [REDACTED]

TABLE 15A

Polishing Composition	Particle Structure	Treatment Level	pH	Zeta Potential (mV)	Conductivity ( $\mu\text{S}/\text{cm}$ )	Particle Size (nm)
15A	Type (i)	2.3%	4.3	42	101	55
15B	Type (i)	1.3%	4.3	37	88	56
15C	Type (i)	0.7%	4.3	33	89	54
15D	Type (ii)	4.0%	4.3	41	94	48
15E	Type (ii)	2.0%	4.3	35	79	48
15F	Type (ii)	1.5%	4.3	31	86	47
15G	Type (ii)	1.0%	4.3	26	92	47
15H	Type (iii)		3.6	17	437	49
15I	Control	None	3.6	10	206	51
15J	Control	None	4.6	5	51	54

TABLE 15B

Polishing Composition	TEOS Polishing Rate ( $\text{\AA}/\text{min}$ )	
	4 psi	6 psi
15A	1590	1320
15B	2820	4190
15C	2930	4370
15D	1970	780
15E	2900	3330
15F	2940	4150
15G	3025	4360
15H	2470	1500
15I	2750	2260
15J	1520	600



Ex. 31, JA1215-1216 (annotations added); JCCC\_ Ex. A-1, 21 (Tables 15A & 15B) (annotations added); *see also* Ex. 29, JA1153, 1155, 1162; Ex. 30, JA1200. Such particles as described in Examples 15D-G are rightly excluded from appropriation by Plaintiff.

By urging here that the claimed minimum PPC is *not* the result of the internal species, Plaintiff seeks to sweep back into the scope of the claims use of aminosilane coated [REDACTED] particles it previously agreed it did not invent. To the extent those examples were “inventive compositions,” they were the invention of Fusco and excluded from the narrowed claims Plaintiff presented in its non-provisional applications.

In sum, the construction that Plaintiff now argues for is inconsistent with the narrowed claims it actually drafted and obtained. No argument justifies broadening the claims to allow for the claimed minimum PPC to come from surface treatments disclosed in the prior art. The Court should adopt DuPont’s proposed construction, which is in harmony with the words of the claims, disclosure in the specification, prosecution history, and the consistent extrinsic evidence.

### 3. CMC's Reply Position

DuPont (1) alters the patentee's undisputed lexicography of PPC; and (2) imports a functional limitation found nowhere in the specification to require that the claimed PPC "results from" only one source of PPC, while ignoring other sources expressly recited in the claims and specification. Both positions directly contradict Federal Circuit precedent.

DuPont also ignores the third issue raised by CMC, that the PPC should be measured for the group of particles in the polishing composition, as claimed. §III.C.1.b.ii\_pgs.40-41. At the ITC DuPont claimed this was a matter of claim construction (Ex.1\_JA0077-79), but having lost its claim construction argument DuPont has changed its tune and says it relates only to infringement. §III.C.2\_pgs.42-43. Its relevance to infringement is exactly why construction is necessary. *O2 Micro*, 521 F.3d at 1361-62. DuPont manufactured a particle-by-particle non-infringement position (§III.C.1.b.ii\_pg.41) and cannot sidestep the claim construction that would resolve it. The claims recite PPC for a group of particles; DuPont's particle-by-particle theory is wrong. *Id.*

#### a. DuPont's construction of "permanent positive charge" contradicts the specification

DuPont agrees that PPC is a new term that the patentees expressly defined. §III.C.2.a\_pg.43. But DuPont commits two legal errors to broaden the term.

*First*, DuPont entirely omits the three-step filtration test in the express definition of PPC. §III.C.2.a\_pgs.43-44. This test is not optional—it is the core of the definition:

“Notwithstanding, *as used herein*, a *permanent positive charge* of at least 6 mV means that the zeta potential of the colloidal silica particles remains above 6 mV *after the following three step filtration test*...”.

JCCC\_Ex.A-1 (Patent) at 11:14-31. Federal Circuit case law requires that express definitions be followed. §III.C.1.a\_pg.36 (citing *Braintree Labs*, 749 F.3d at 1356).

DuPont has no basis to ignore the full definition, and DuPont feigns confusion about CMC’s “note.” §III.C.2.a\_pg.44. But the “note” just recites the “following three step filtration test” from the patent. JCCC\_Ex.A at 5-6.<sup>21</sup> Whether or not called a “note,” the substance is the same—the patentees required the three-step filtration test for measuring PPC. §III.C.1.a\_pg.36-37.

DuPont also argues that, because the three-step test is defined with an exemplary PPC of 6 mV, the test itself is exemplary. §III.C.2.a\_pgs.44-45. This distorts the example, which does not change the definitional nature of the statement: “*as used herein*, a permanent positive charge of at least 6 mV means that the zeta potential of the colloidal silica particles remains above 6 mV *after the following three step filtration test*.” JCCC\_Ex.A-1 (Patent) at 11:14-31. Any POSA would have understood that to achieve a PPC of any level (6 mV or otherwise) it must result in a zeta potential of that level *after the three-step test*. *Id.* In this regard, *Silicon Graphics*, which dealt with a feature in “one embodiment” rather than a definitional statement, has no relevance.<sup>22</sup> §III.C.2.a\_pg.44; *Silicon Graphics*, 607 F.3d at 792-93. When definitional language is used—as it is here—lexicography governs. *Phillips*, 415, F.3d at 1316; *Braintree Labs*, 749 F.3d at 1356.

DuPont also argues that application of the three-step test in Example 10B justifies ignoring the patentees’ lexicography. §III.C.2.a\_pgs.44-45. But Example 10B specifically applies the definitional test to measure exemplary compositions. JCCC\_Ex.A-1 (Patent) at 11:30-31, 27:63-28:12, 28:28-32. DuPont asserts that Example 10B “implements the test differently.” §III.C.2.a\_pg.44. But the difference DuPont alleges—ionic strength correction—supplements but

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<sup>21</sup> DuPont uses “notes,” too. Ex.1\_JA0058 (ID); JCCC\_Ex.A\_pg.3.

<sup>22</sup> *Silicon Graphics* construed multiple terms. CMC’s Term 2 Reply Position cites construction of the term “a rasterization process....” DuPont’s Answering Position cites the construction of “S10e5.”

does not alter the triple filtration requirement defined by the inventors. JCCC\_Ex.A-1 (Patent) at 28:28-45; *see also id.* at 11:56-61. That is clear from the specification, which states expressly that Example 10B illustrates application of “[t]his three step filtration” test. *Id.* at 11:30-31.

DuPont similarly argues to ignore the definitional three-step filtration test because the patent provides examples for the volume of polishing composition to test (e.g., 200 ml) and the ultrafiltration disk to use (e.g., one having a MW cutoff of 100,000 Daltons). §III.C.2.a\_pgs.44-45. But these examples are not relevant to (and do not change) the required, definitional three-step filtration test. DuPont certainly cannot argue that use of the abbreviation “e.g.” for the volume and filtration disk examples undermines the patentees’ definition, as DuPont’s own construction does the same (“for example”). Unsurprisingly, DuPont cites no law that would support such a conclusion. §III.C.2.a\_pgs.43-45.

*Second*, DuPont changes the patentees’ definition of PPC by replacing the term “positive charge” with the term “positive zeta potential.” §III.C.2.a\_pg.43 (citing JCCC\_Ex.A-1 (Patent) at 11:4-6). DuPont argues that the patentees’ lexicography should be altered to include a portion of a background section explaining that “charge” is “commonly referred to in the art as zeta potential.” JCCC\_Ex.A-1 (Patent) at 10:38-42. But “a definition of a claim term in the specification will prevail over a term’s ordinary meaning if the patentee has acted as his own lexicographer.” *3M Innovative Properties Co. v. Avery Dennison Corp.*, 350 F.3d 1365, 1371 (Fed. Cir. 2003). Here the patentees defined PPC as “positive charge” not “positive zeta potential,” as DuPont concedes. §III.C.2.a\_pg.43 (citing JCCC\_Ex.A-1 (Patent) at 11:4-6). That definition controls. *Phillips*, 415 F.3d at 1316.

DuPont’s reliance on extrinsic evidence also fails. DuPont cites its expert to argue that, despite use of “charge” in the express definition, the units of PPC (mV) must refer to zeta potential,

not charge. §III.C.2.a\_pgs.43-44. But DuPont ignores that the definition of PPC is not a measurement of just any mV, but a measurement of mV *after* a triple filtration test *designed* by the inventors to reflect permanent *charge* on the particle, rather than zeta potential. JCCC\_Ex.A-1 (Patent) at 11:14-31. Swapping out “zeta potential” for “charge” disregards the patentee’s lexicography, without any basis for doing so. *Phillips*, 415, F.3d at 1316.

**b. DuPont’s insertion of the phrase “results from” into the patentee’s definition has no support**

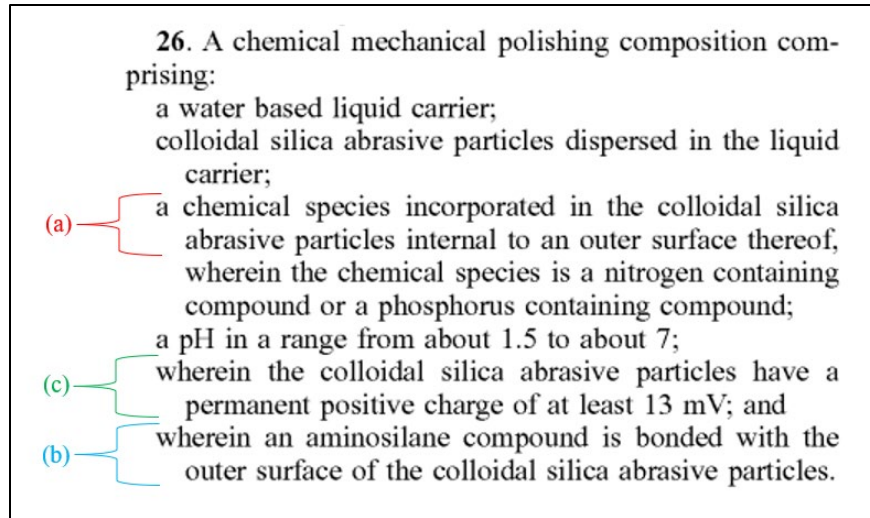
The second part of DuPont’s proposal imports into both claims 1 and 26 an unrecited functional limitation—that the PPC must “*result from*” the internal chemical species only (underlined in red below).

DuPont’s Proposed Construction

The colloidal silica abrasive particles have a positive zeta potential of at least [15 or 13] mV that is not readily reversible, for example, via flushing, dilution, filtration, and the like, and that results from the chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof.

§III.C.2\_pg.42.

This new limitation in fact *contradicts* express claim language. As shown below, claim 26 recites (a) an internal chemical species; (b) an aminosilane bonded to the outer surface of the particles; and (c) a PPC greater than 13 mV.



DuPont concedes that both (a) and (b) can contribute to a PPC greater than 13 mV. Ex.41\_JA1457 (DuPont 1204 PostHB). Nonetheless, DuPont’s construction would *require* all of the PPC of 13 (or 15) mV to result *only from* the internal chemical species and *exclude* any contribution to PPC from the expressly recited externally bonded aminosilane. A construction that intentionally ignores claim limitations is not correct. *Vederi, LLC v. Google, Inc.*, 744 F.3d 1376, 1383 (Fed. Cir. 2014) (construction “effectively reading [term] out the claims [*sic*]” was error).

Nothing in the specification supports this rewriting of the claims. The PPC test *requires* particles to be measured as they exist in a composition—thereby accounting for the impact of any internal chemical species *and* any externally bonded species. JCCC\_Ex.A-1 at 11:17-18 (PPC test measures the “polishing composition”); *see also* Ex.13\_JA0569-70 (CMC ITC Expert Testimony). DuPont’s construction splits up the particle and measures the internal portions but not the external portions—an impossible task the patentees never contemplated let alone described. Even DuPont’s experts do not agree with this contorted interpretation. *See, e.g.*, Ex.44\_JA1500 (DuPont ITC Expert Hearing Testimony) (“[W]hen the particle has both internal ...species and surface treatment, the ...measurements cannot be attributable to only the internal chemical species.”).

The overwhelming intrinsic records supports CMC. §III.C.1.b\_pgs.37-41. DuPont’s entire position, on the other hand, appears based on misapplied Federal Circuit law, its own theory of what is “meaningful,” incomplete citations, and a hodgepodge of extrinsic material. §III.C.2.b.i\_pgs.45-50. None of that justifies departing from the claim. *Phillips*, 415 F.3d at 1317.

**i. DuPont ignores the claim language**

DuPont’s arguments regarding the claim language turns claim construction law on its head.

For example, DuPont argues that because PPC appears in a wherein clause, it is proper to import this phrase to tie PPC to the internal chemical species. §III.C.2.b.i\_pg.45. This leap of logic is legally incorrect. *Alere* and *K2*, cited by DuPont, state that a wherein clause can contain functional language but certainly *do not* condone importing functional language (or any language) that changes the claim. *Alere*, 791 Fed. App’x at 176-77; *K-2 Corp.*, 191 F.3d at 1362-63. Here the wherein clause is not functional. But even if it were, DuPont has no basis (and cites none) to selectively tie the claimed PPC to the claimed internal chemical species while ignoring the PPC contribution of externally bonded aminosilane.

DuPont also tries to limit the asserted composition claims to a specific order in which external aminosilane is applied “later” after PPC measurement. §III.C.2.b.i\_pg.47 (superimposed red line). But a composition is a mixture, not a recipe or set of ordered steps. *Exxon Chem. Patents, Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1557-58 (Fed. Cir. 1995) (“Exxon claims a product, not merely a recipe for making whatever product results from the use of the recipe ingredients. This conclusion respects that which is claimed, namely a chemical composition.”); *Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1344 (Fed. Cir. 2008) (“Courts must generally take care to avoid reading process limitations into an apparatus claim because the process by which a product is made is irrelevant to the question of whether that product infringes a pure apparatus claim.”) (citations omitted). The order of the words does not allow DuPont to import a limitation into the

claim. *Alere*, 791 F. App'x at 177 (for apparatus, “the claim language does not create a process limitation”).

Finally, DuPont argues that because claim 1 does not expressly recite external aminosilane, the express recitation of external aminosilane in claim 26 should just be ignored, and the PPC in both claims should exclude any contribution from external aminosilane. §III.C.2.b.ii\_pgs.50-51. DuPont unsurprisingly cites no authority for this position. Claim 1 is a comprising claim—it does not *exclude* any unrecited limitations. *Crystal Semiconductor*, 246 F.3d at 1348. Just like claim 26, it could be practiced by any particles that have PPC greater than the threshold, including those with external aminosilane, as long as the recited limitations are met.

## ii. DuPont ignores the specification

DuPont also cites no specification support for its position, instead resorting to nebulous characterizations of the invention's purpose that *contradict* the '721 Patent's disclosure.

For example, DuPont argues because the '721 Patent discloses that the inventors were the first to realize the benefit of internal chemical species, that means *all* the PPC has to come from an internal chemical species, and *none* can result from externally bonded aminosilane. §III.C.2.b.i\_pg.46. But claims 1 and 26 already explicitly require that the composition include the innovation of internal chemical species. Nothing in the patent requires that internal chemical species be the *sole* source of PPC to achieve the claimed threshold. DuPont contends column 7:56-8:3 shows contributions from surface treatment do not count towards the claimed PPC (§III.C.2.b.i\_pgs.46-47), but column 7 says precisely the opposite—that PPC from internal chemical species can be less than the claimed cutoffs of 15 or 13 mV “prior to the surface treatment.” JCCC\_Ex.A-1 at 7:56-8:3; §III.C.1.b.i\_pgs.38-40. That is a key benefit of the invention—if particles have internal chemical species with a PPC, even if less than the threshold,



then less externally bonded aminosilane is needed to exceed the claimed cutoff, leading to better polishing performance. JCCC\_Ex.A-1 at 7:56-8:3; §III.C.1.b.i\_pg.39.

DuPont also asks the Court to change the claim because the functional limitation is an “essential feature[]” of the invention. §III.C.2.b.i\_pgs.45-46. But that is precisely what the Federal Circuit has said not to do. *Golight, Inc. v. Wal-Mart Stores, Inc.*, 355 F.3d 1327, 1331 (Fed. Cir. 2004) (not “all...features described as significant or important” are claimed); *E-Pass Techs., Inc. v. 3Com Corp.*, 343 F.3d 1364, 1370 (Fed. Cir. 2003) (“no requirement that every claim...encompass all” features).

In any event, the patent does not describe PPC resulting *only* from internal chemical species as an “essential feature” or “purpose” of the invention. DuPont cites a *portion* of the summary of the invention describing “incorporating internal chemical species ‘such that the colloidal silica abrasive particles have a positive charge of at least 15 mV’” (§III.C.2.b.i\_pg.46) but ignores the rest, which states the opposite—that PPC can *further* result from externally bonded aminosilane: “particles may further include an *aminosilane compound bonded with the outer surface* thereof *such that* the colloidal silica abrasive particles *have a permanent positive charge of at least 13 mV.*” JCCC\_Ex.A-1 at 2:32-35. Likewise, DuPont points to a description of PPC that “may be the result of” internal chemical species (*e.g.*, §III.C.2.b.i\_pg.46 (citing JCCC\_Ex.A-1 at 11:6-8)), but ignores the very next sentence that describes that the PPC “may further result from a covalent interaction” with the particle surface (*i.e.*, surface treatment). JCCC\_Ex.A-1 at 11:8-10.

DuPont similarly distorts Example 15 to argue this example is not claimed. §III.C.2.b.ii\_pg.52. But Example 15 tracks claim 26—it includes particles with (a) internal chemical species; (b) externally bonded aminosilane; and (c) a PPC higher than 13 mV. §III.C.1.b.i\_pgs.38-40. DuPont’s construction contradicts the specification and excludes this

embodiment. *GE Lighting*, 750 F.3d at 1311 (“[W]here claims can reasonably [be] interpreted to include a specific embodiment, it is incorrect to construe the claims to exclude that embodiment, absent probative evidence on the contrary.”); *MBO Lab’ys, Inc. v. Becton, Dickinson & Co.*, 474 F.3d 1323, 1333 (Fed. Cir. 2007) (“construction impermissibly excludes these embodiments”).

**iii. DuPont’s prosecution history arguments are irrelevant**

The prosecution history likewise does not support rewriting the claims. DuPont’s contention regarding alleged “abandoned claims” is nonsensical. The claims DuPont contends were “dedicate[ed] to the public” did not require PPC that “results from” internal species alone, nor did the patentee distinguish its invention from the prior art based on such a feature. Rather, in distinguishing Fu the patentee simply stated that the patent “provide(s) multiple strategies for forming...particles having a positive charge by incorporating a chemical species internal to the outer surface,” *not* that the claims require *all* PPC to “result from” internal species as DuPont contends. JCCC\_Ex.A-2\_pg.95; *see also Thorner*, 669 F.3d at 1367.

**iv. DuPont’s extrinsic evidence also supports CMC’s construction**

The extrinsic material also supports CMC, not DuPont. For example, DuPont cites inventor testimony describing the innovation of internal chemical species. §III.C.2.b.i\_pg.50. But this testimony does not help DuPont—the inventors consistently described the *combination of internal and external charge* as a key improvement. *E.g.*, Ex.9\_JA0485 (Inventor ITC Testimony)

( [REDACTED]

[REDACTED]); Ex.42\_JA1472-73 (Inventor ITC Deposition) ([REDACTED]

[REDACTED]

[REDACTED]); Ex.43\_JA1484-85 (Inventor ITC Deposition) ([REDACTED]

[REDACTED]). This testimony also demonstrates

the flaw in DuPont’s logic that because prior art particles had *only* external aminosilane, it somehow limits the claims to particles with *only* internal chemical species.<sup>23</sup> §III.C.2.b.ii\_pgs.51-52. The claims do not cover particles with *only* external aminosilane but do clearly cover the inventive boost of having internal chemical species and external aminosilane, as the inventors described. §III.C.1.a\_pgs.36-38.

DuPont also mischaracterizes CMC’s expert, who did *not* testify that the claims cover particles having only [REDACTED]. §III.C.2.b.ii\_pg.50. CMC’s expert said the opposite—that [REDACTED]. Ex.45\_JA1514 (CMC Expert ITC Hearing Testimony).

Finally, DuPont cites a slew of technical documents that allegedly show that the inventors secretly intended to limit the claims to require PPC to “result from” only internal chemical species (despite it being unrecited) to avoid allegedly prior art Fuso particles. §III.C.2.b.ii\_pgs.52-56. *First*, DuPont’s unsupported speculation about the inventors’ secret “inten[t]” is not evidence at all—extrinsic or intrinsic. *Id.* pg.54 (purporting to infer inventor intent based on irrelevant documents and testimony excerpts). *Second*, the claims are not ambiguous and DuPont does not assert otherwise; “[t]he doctrine of construing claims to preserve their validity...has no applicability here.” *Phillips*, 415 F.3d at 1327-28. *Third*, the specific BS-2H, HL, PL-3C, and PL-5C particles DuPont identifies are not prior art to the ’721 Patent at all. Ex.40\_JA1393-1444 (Validity Contentions) (showing same are not prior art).

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<sup>23</sup> CMC’s U.S. Patent No. 7,994,057 does not support DuPont’s “results from” construction for at least this reason. §III.C.2.b.i-ii\_pgs.48,51-52.

Ultimately, the Court need not wade through DuPont's speculative and unsupported arguments relating to hundreds of pages of inventor testimony and technical documentation (about which DuPont does not even seek to present live testimony) because the proper claim construction is clear from the intrinsic evidence, all of which supports CMC.

#### 4. Defendants' Sur-Reply Position

##### a. "Permanent Positive Charge" and "Charge"

DuPont's proposed construction recapitulates the patent's express definitions for "permanent positive charge" and "charge." *See* JCCC\_Ex.A-1, 10:38-42 (defining "charge" for PPC), 11:4-6 (defining "permanent positive charge"). Plaintiff's narrowing construction "note" incorporating an exemplary 6-mV "three-step filtration" embodiment is wrong for multiple reasons. §III.C.3.a\_pgs.57-59 (6 mV test "is the core of the definition").

First, Plaintiff fails to rebut that the relied-upon embodiment is specific to 6 mV PPC and that exemplary embodiments should not be imported into the claims. *Compare* JCCC\_Ex.A-1, 11:4-6 *with* 11:14-31; §III.C.2; *see also* *Silicon Graphics*, 607 F.3d at 792-93. Plaintiff's attorney argument that the embodiment is definitional for PPC as a whole is contradicted by the patent only specifying it for determining "a [PPC] of at least 6 mV." §III.C.3.a\_pg.58; JCCC\_Ex.A-1, 11:14-17; *Mosaic Brands, Inc. v. Ridge Wallet LLC*, 55 F.4th 1354, 1362 (Fed. Cir. 2022) (rejecting attorney argument regarding claim construction).

Second, as has been explained (§III.C.2.a\_pgs.44-45), Term 3 becomes unworkable under Plaintiff's construction. *See* *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 904 F.3d 965, 972 (Fed. Cir. 2018) (rejecting construction that would "impermissibly render the claims inoperable"). For instance, Example 10—referenced but not included in Plaintiff's construction—employed ionic strength adjustments not mentioned in the "note" that significantly altered PPC from 56 to 41 mV. JCCC\_Ex.A-1, 28:1-56 (see composition 10B). It would be at best ambiguous whether the jury would need to read-in specifics from Example 10 to apply Plaintiff's construction.

As for "charge," Plaintiff ignores (§III.C.3.a\_pg.59) the patent's definition of "charge" in PPC as what "is commonly referred to in the art as the zeta potential." JCCC\_Ex.A-1, 10:38-42; §III.C.2.a\_pg.43. Nor does Plaintiff dispute that "charge" is measured in coulombs while "zeta

potential” is measured in mV (§III.C.2.a\_pgs.43-44; JCCC\_Ex.A-1, 28:12-56). Yet Plaintiff would nonetheless require literally measuring particle “charge” as opposed to zeta potential, something done nowhere in the patent.

Finally, without citation to arguments made by DuPont (instead citing to the ALJ’s non-binding opinion), Plaintiff accuses DuPont of requiring separately measuring PPC for each of the millions of individual particles in a CMP slurry. §III.C.3\_pg.57. DuPont has not so argued—instead properly noting in the context of Plaintiff’s defective infringement testing that “*the* colloidal silica abrasive particles have a [PPC] of at least” requires measuring PPC of “*the* colloidal silica abrasive particles” recited in the claim as opposed to the zeta potential [REDACTED]—and its construction likewise does not so require. §III.C.2\_pgs.42-43. The Court can ignore Plaintiff’s strawman.

#### **b. PPC Threshold**

As explained (§III.C.2.b.i\_pgs.45-50), the words and structure of the claims compel construing the minimum PPC threshold as resulting from the recited internal chemical species. Claim 1 cannot be meaningfully construed otherwise, as there is no other source for PPC. This applies equally to claim 26, which follows the identical structure through the PPC limitation, then reciting external aminosilane as a further limitation *after* the PPC limitation, requiring similar construction in both claims (*id.*, pgs.46-48):

<p>1. A chemical mechanical polishing composition comprising:</p> <ul style="list-style-type: none"> <li>a water based liquid carrier;</li> <li>colloidal silica abrasive particles dispersed in the liquid carrier;</li> <li>a chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof, wherein the chemical species is a nitrogen containing compound or a phosphorus containing compound;</li> <li>a pH in a range from about 3.5 to about 6;</li> <li>wherein the colloidal silica abrasive particles have a permanent positive charge of at least 15 mV; and</li> <li>wherein the chemical species is not an aminosilane or a phosphonium silane.</li> </ul>	<p>26. A chemical mechanical polishing composition comprising:</p> <ul style="list-style-type: none"> <li>a water based liquid carrier;</li> <li>colloidal silica abrasive particles dispersed in the liquid carrier;</li> <li>a chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof, wherein the chemical species is a nitrogen containing compound or a phosphorus containing compound;</li> <li>a pH in a range from about 1.5 to about 7;</li> <li>wherein the colloidal silica abrasive particles have a permanent positive charge of at least 13 mV; and</li> <li>wherein an aminosilane compound is bonded with the outer surface of the colloidal silica abrasive particles.</li> </ul>
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DuPont's construction also effectuates the specification's description of the alleged invention as an "alternative" to prior art particles having charge resulting from external aminosilane coating. JCCC\_Ex.A-1, 5:3-10, 5:21-28; §III.C.2.b.i\_pg.46. Plaintiff ignores this unambiguous "statement of the described invention's purpose," which "informs the proper construction of claim terms." *Kaken Pharm. Co.*, 952 F.3d at 1352.

A proper construction "start[s] with the plain language of the claim." *Alere*, 791 Fed. Appx. at 176. However, Plaintiff skips over claim 1, seeking to work backwards from claim 26 where it considers the final aminosilane limitation (what Plaintiff labels "b") as somehow prior to PPC limitation (Plaintiff's "c" limitation):

<p>26. A chemical mechanical polishing composition comprising:</p> <ul style="list-style-type: none"> <li>a water based liquid carrier;</li> <li>colloidal silica abrasive particles dispersed in the liquid carrier;</li> <li>(a) a chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof, wherein the chemical species is a nitrogen containing compound or a phosphorus containing compound;</li> <li>a pH in a range from about 1.5 to about 7;</li> <li>(c) wherein the colloidal silica abrasive particles have a permanent positive charge of at least 13 mV; and</li> <li>(b) wherein an aminosilane compound is bonded with the outer surface of the colloidal silica abrasive particles.</li> </ul>
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§III.C.3.b\_pgs.60-61 (red highlights added). Plaintiff's *reconstruction* contradicts the claim's "grammatical structure and syntax," which are instructive "in determining the true meaning of the language."<sup>24</sup> *Credle*, 25 F.3d at 1571.

Even leaving aside Plaintiff's reconstruction, the external ("outer surface") aminosilane according to claim 26 and the embodiment (JCCC\_Ex.A-1, 7:62-67) cited by Plaintiff (§III.C.3.b.ii\_pgs.63-65) do not support construing the claimed threshold PPC as resulting from other than the claimed internal chemical species. §III.C.2.b.i\_pgs.45-48; §III.C.2.b.ii\_pgs.51-56. The specification instead makes clear that in embodiments corresponding to claim 26 the threshold PPC necessarily results from the internal chemical species because the lower positive charge is expressly of "the particles *prior to the surface treatment*." JCCC\_Ex.A-1, 7:56-64. The specification further distinguishes prior art particles relying on charge from surface-coated aminosilane from its alleged invention being "alternatively" moving the charge to the inside of the particles. *Id.*, 5:21-24. Construing the threshold PPC to result from external aminosilane would be no "alternative[]" whatsoever. *Tech. Patents*, 700 F.3d at 494 (rejecting broader construction as contrary "to the heart of the invention's alleged improvement over the prior art"). Contrary to Plaintiff's contentions that "DuPont ignores the specification" by reading out an embodiment, DuPont demonstrated how Plaintiff narrowed its provisional claims to avoid certain undisclosed Fuso particles and consequently excluded embodiments. §III.C.3.b.ii\_pg.63; §III.C.2.b.i\_pgs.45-48; §III.C.2.b.ii\_pgs.51-56; JCCC\_Ex.A-2\_pg.21(¶33),48-49; JCCC\_Ex.A-1, 7:62-64. Plaintiff

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<sup>24</sup> Recognizing that the PPC "wherein" clause "includes functional language that informs us of the structural requirements of the claim," (*Alere*, 791 Fed. Appx. at 177), is distinct from importing "a recipe or set of ordered steps," as Plaintiff alleges. §III.C.3.b.i\_pg.62. *Exxon*, cited by Plaintiff (*id.*), addressed whether a composition claim covered the product or a recipe of making the product and is inapposite. 64 F.3d at 1557-58.



did not substantively respond, beyond manufacturing non-existent and non-responsive disputes on “intent” and “preserv[ing] validity.” §III.C.3.b.iv\_pgs.55-56.

Plaintiff’s working backwards from claim 26 to modify claim 1 is further contrary to the prosecution history, including the provisional application. *See Trs. of Columbia Univ. in New York v. Symantec Corp.*, 811 F.3d 1359, 1365 (Fed. Cir. 2016) (relying on provisional application for claim construction). Claim 1 has its roots in claim 6 of the provisional application, which contained the same “wherein” PPC clause (with an 8-mV threshold). JCCC\_Ex.A-2\_pg.49. Like the issued patent, the provisional distinguished prior art surface treatments and described the invention as “*alternatively*... incorporating certain positively charged chemical species into the abrasive particles.” *Compare* JCCC\_Ex.A-2\_pgs.14-15 (¶¶15-16), *with* JCCC\_Ex.A-1, 5:3-14. The provisional did not include an equivalent of claim 26 or the later embodiment at column 7:56. Thus, the “wherein the colloidal silica abrasive particles have a [PPC] of at least” clause in the issued patent and its provisional can only be construed as resulting from the incorporated chemical species, their common supporting disclosures providing no alternative. *See Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1480 (Fed. Cir. 1998) (holding that a claim “may be no broader than the supporting disclosure”).

Plaintiff next argues the PPC “wherein clause *is not functional*” and accuses DuPont of “ignor[ing] the specification” in this regard. §III.C.3.b.i-ii\_pgs.62-63. If Plaintiff’s attorney argument were correct—that is, the PPC limitation is not “functional language that informs us of the structural requirements of the claim,” (*Alere*, 791 Fed. App’x at 177-178)—the PPC limitation would have no patentable weight. *See In re Kubin*, 561 F.3d 1351, 1357 (Fed. Cir. 2009) (functional “wherein” clause given no patentable weight where “not an additional requirement imposed” on the claimed structure). This would be irreconcilable with the specification’s

description of the alleged invention and distinction over prior art. JCCC\_Ex.A-1, 5:3-26. The absence of a functional requirement on the claimed structure would also contradict the prosecution history where (as Plaintiff appears to concede) it represented that its alleged invention entailed “particles having a positive charge by incorporating a chemical species internal to an outer surface.” JCCC\_Ex.A-2\_pg.95; §III.C.2.b.i\_pgs.48-50; §III.C.3.b.iii\_pg.65.

Finally, Plaintiff’s cherry-picked extrinsic evidence does it no favors. §III.C.3.b.iv\_pgs.65-66. Its inventor testimony is consistent with the *threshold* PPC resulting from the internal chemical species with *additional* charge due to external aminosilane. *See, e.g., id.* (*citing* Ex.42\_JA1472-73 ([REDACTED])); Ex.43\_JA1484-85 (describing implementing the invention with [REDACTED])).

Plaintiff’s ITC expert’s testimony that the internal chemical species must have a [REDACTED] on PPC is similarly unavailing.<sup>25</sup> §III.C.3.b.iv\_pg.66; Ex.45\_JA1514. It reinforces the functional nature of the limitation for which the internal chemical species remains the only possible source of PPC in the common structure of claims 1 and 26 and the only standard for the amount thereof. Plaintiff also never directly addresses the extrinsic evidence reflecting why Examples 2 and 15 are not claimed embodiments, specifically that they embodied what Plaintiff had agreed were pre-existing [REDACTED] including [REDACTED] particles it had [REDACTED]—withheld from the USPTO—that were not Plaintiff’s invention. §III.C.2.b.ii\_pgs.52-56; Ex.28\_JA1117-18; §III.C.3.b.iv\_pgs.65-67; Ex.46\_JA1524-30 (showing BS-2H particles are prior art).

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<sup>25</sup> Plaintiff has not explained (and cannot explain) the scope of [REDACTED] the meaning of which is per se indefinite. *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1255-56 (Fed. Cir. 2008) (affirming indefiniteness of “fragile gel” limitation).

At bottom, DuPont's construction tracks the structure of the claims, the specification's definitions and characterization of the alleged invention, and the prosecution history including the provisional application and Plaintiff's arguments relied upon by the examiner. By contrast, Plaintiff expressly contradicts the words and structure of the claims and erases any possible distinction from, among other particles [REDACTED], the use of aminosilane coated [REDACTED] particles it did not invent.

**D. TERM 4 (Claim 26):**

“*[a]* a chemical species incorporated in the colloidal silica abrasive particles internal to an outer surface thereof, *[b]* wherein the chemical species is a nitrogen containing compound or a phosphorus containing compound ...”

**1. CMC’s Opening Position**

Term 4 is identical to Terms 2a and 2b. But DuPont proposes a separate construction for Term 4 “for claim 26 only,” in contrast to its proposal to construe Terms 2a, 2b, and 2c “as a whole.” *See* JCCC\_Ex. A at 3, 9. The parties’ disputes for Term 4 (in claim 26) appear to be exactly the same as for Terms 2a and 2b (in claim 1). Indeed, in its Invalidity Contentions, DuPont does not separately address these elements in claim 26, but simply states “*See, e.g.,* claim 1 above.” Ex.2\_JA0345–46 (Invalidity Contentions). For Term 4 (claim 26), CMC proposes the same constructions for the same phrases in Terms 2a and 2b (Claim 1). *Fin Control Sytems Pty, Ltd. v. OAM, Inc.*, 265 F.3d 1311, 1318 (Fed. Cir. 2001) (“[W]e begin with the presumption that the same terms appearing in different portions of the claims should be given the same meaning ....”).

## 2. Defendants' Answering Position<sup>26</sup>

DuPont proposes this clause, as found in whole in claim 26, should be construed as a whole as:

The colloidal silica abrasive particles contain within their outer surfaces one or more nitrogen or phosphorous containing compounds.

DuPont's construction is consistent with the intrinsic evidence, as discussed for Term 2 above. It is necessary to construe Term 4 separately, however, as claim 26 does not include the Term 2 negative "wherein" limitation in claim 1.<sup>27</sup>

## 3. CMC's Reply Position

DuPont says its Term 4 construction "is consistent with the intrinsic evidence," "discussed for Term 2 above." §III.D.2\_pg.76. However, DuPont does not discuss Term 4 (or the identical Terms 2a and 2b), except to acknowledge that its original construction was wrong. *Id.*\_n.27 (revising construction). DuPont's construction for Term 4 (and Terms 2a and 2b) makes numerous departures from the claim language, which DuPont cannot explain. §III.B.1\_pgs.15-16; *Id.*\_§III.D.1\_pg.75.

## 4. Defendants' Sur-Reply Position

Plaintiff does not appear to dispute that the absence of the negative limitation in claim 26 requires Term 4 to be construed separately from Term 2. *See* §III.D.2\_pg.76; §III.D.3\_pg.76. Rather, Plaintiff simply states, without explanation, that DuPont's construction "makes numerous departures from the claim language." §III.D.3\_pg.76. Plaintiff's unsupported position should be disregarded.

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<sup>26</sup> DuPont has clarified its construction to recite "nitrogen *or* phosphorous containing compounds."

<sup>27</sup> The absence of the negative "wherein" limitation in claim 26 also obviates Plaintiff's arguments about excluding embodiments that contain both aminosilane and non-aminosilane chemical species. §III.D.1\_pg.75; *see supra* §III.B.2.

**E. TERM 5 (Claim 26):**

**“wherein an aminosilane compound is bonded with the outer surface of the colloidal silica abrasive particles”**

CMC’s Construction	DuPont’s Construction
Plain and ordinary meaning, <i>i.e.</i> , “bonded with the outer surface of the colloidal silica abrasive particles”  Note: CMC proposes a construction for the bolded language only.	Plain and ordinary meaning, <i>i.e.</i> , “bonded with the outer surface of the colloidal silica abrasive particles”

**1. CMC’s Opening Position**

There is no dispute for this term. Both parties propose the plain and ordinary meaning. JCCC\_Ex. A, pg. 11. The scope of “bonded with the outer surface” is unambiguous in view of the ’721 Patent’s specification and extrinsic evidence. JCCC\_Ex. A-1 (’721 Patent) at 30:19–43 (bonding with surface through growth process), 28:22–26 (surface treatment after particle is formed); Ex.13\_JA0575 (CMC’s ITC Expert Testimony) (explaining that “bonded with the outer surface of the colloidal silica abrasive particles” should have its plain and ordinary meaning and ...[that] the words of the claim are understandable to one of ordinary skill in the art without further elaboration.”); Ex.1\_JA0089 (ID) (adopting CMC’s plain and ordinary construction).

However, DuPont requests that this term remain disputed “as the parties may not agree to what is the plain and ordinary meaning,” without clarifying what DuPont “may not agree to.” JCCC\_Ex. A, pg. 11 n.2. But now is the time to disagree.<sup>28</sup> There is no need to construe terms absent a material dispute. *Vivid Tech.*, 200 F.3d at 803 (Fed. Cir. 1999); *see also Sciele Pharma*, 2011 WL 4351672 at \*10.

<sup>28</sup> DuPont’s non-infringement and invalidity contentions did not include any contention that a disputed issue depends on the construction of this term.

## 2. Defendants' Answering Position

Defendants and Plaintiff both propose construction of Term 5 as “bonded with the outer surface of the colloidal silica abrasive particles.” Accordingly, the Court can give it this undisputed meaning.

However, while Plaintiff states that “[t]he scope of ‘bonded with the outer surface’ is unambiguous in view of the ’721 Patent’s specification and extrinsic evidence” it argues that Term 5 “an aminosilane compound [] bonded ***with an outer surface***” covers the Example 13 “colloidal silica particles having an outer silica ***shell containing*** the aminosilane.” See §III.E.1\_pg.77; JCCC\_Ex. A-1, 19 (Example 13) 30:33-37. This nonsensical assertion—conflating a species *within the volume* of the particle with one *on the surface* of the particle—reinforces the necessity of the Court to expressly construe both Terms 1 (“outer surface”) and 5. See *O2 Micro*, 521 F.3d at 1361.

The Court should thus construe Term 5 according to its agreed-upon plain and ordinary meaning together with DuPont’s construction Term 1 (“outer surface”) as “***the external silica surface*** of the colloidal silica abrasive particle available for surface treatment and/or abrasive contact with a substrate to be polished.”

## 3. CMC’s Reply Position

There appears to be no unique dispute for this term. §III.E.2\_pg.78 (“undisputed meaning”). But DuPont reiterates its “outer surface” construction and misrepresents CMC’s position regarding Example 13 (*Id.*), which is addressed above for Term 1.

## 4. Defendants’ Sur-Reply Position

Plaintiff does not appear to dispute that its construction would result in a nonsensical meaning. See §III.E.2\_pg.78; §III.E.3\_pg.78.

Respectfully submitted,

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**CERTIFICATE OF SERVICE**

I hereby certify that on January 19, 2024, this document was served on DuPont-Delaware@finnegan.com, IPservice@potteranderson.com and on the persons listed below in the manner indicated:

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